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An Address
ON
YESTERDAY, TO-DAY, AND TO-MORROW.

Being the Presidential Address delivered at the Annual Meeting of the British Medical Association in Bradford on July 22nd, 1924,

BY J. BASIL HALL, M.A., M.CH. CAMB.,
HONORARY CONSULTING SURGEON, BRADFORD ROYAL INFIRMARY.

MY LORD BISHOP, LADIES AND GENTLEMEN,—As a Bradford citizen, my first words must be those of a very warm welcome to the British Medical Association. As the President of that Association, on the other hand, I can truly say that I, and every other member of it, have greatly appreciated the very cordial and hospitable reception which the citizens of Bradford have given to us. Although our Association has existed for upwards of 90 years without visiting this city, I can assure you that it was recognised long ago that Bradford had only to be asked and a generous response would be forthcoming.

There is an incident in the history of this city which coincides with the birth of the British Medical Association. In 1832 the Association came into being, and almost simultaneously the town of Bradford was granted the privilege of returning two Members of Parliament. Whether this privilege proved a boon to the city or otherwise I do not know, because I am ignorant of the political views which those Members held. I can only say that I hope they coincided with my own. As regards the birth of the British Medical Association, however, I have no doubts. That great body has done an unspeakable service in binding together the great mass of the medical profession into one solid professional unity. At its inauguration in Worcester by Sir Charles Hastings some 50 original members were enrolled. To-day its membership numbers 27,000 members, scattered over the whole world, and it can justly claim that its voice is the voice of a profession throughout an empire upon which the sun never sets.

I am not going to weary you by recording all that this great Association has accomplished during its long existence, but I cannot refrain from mentioning what I regard as its greatest achievement. When war broke out in 1914 our army was served by the Royal Army Medical Corps. That is a very small body, large enough to give medical service to our soldiers in times of peace, but totally inadequate to meet the requirements of a great war. The British Medical Association promptly established a central war committee and through it provided for our army a regular and organised supply of medical officers throughout the whole campaign. The cost of that patriotic service amounted to £20,000, and it is the proud boast of this country to-day that the care of the sick and wounded has never been equalled in the previous history of the world. If the Association had never done anything else, its war record has more than justified its existence.

Before proceeding further I want to express my very sincere thanks for the loyal and unstinted help which has been so generously given in order that this meeting, the first of its kind in Bradford, should prove a success. When I look back upon the past 12 months and try to realise all the generous service which has been so willingly rendered, I feel that I cannot adequately express my thanks. To name some and omit others would appear invidious, but I must mention our Lord Mayor and others who represent the corporation of this city; and I would especially thank the ladies' committees who have done such yeomen service. Even in the Garden of Eden Adam was a failure till Eve came along, and although she let him down very badly to begin with, she has since earned his eternal gratitude, and we recognise to-day that without her coöperation our annual meetings must prove a failure.

A gathering like this is not merely a national conference. It is something which knits together a professional brotherhood which extends throughout the world. It brings together representatives from all parts of the British Isles, from our overseas dominions, and from the great contingents of Europe and America. It accepts representatives of all those who work with a common object from nations outside our Empire, and it welcomes them as members of a great medical fraternity. There is no such word as "foreign" in the world of medicine. Politicians talk about a League of Nations, but in medicine nations count as nothing. The fight against disease is carried on wherever the human race exists, and we recognise that each does his best according to the knowledge vouchsafed to him. I was told recently that Bradford had no medical traditions and its reputation had still to be made. I accepted the insult with equanimity because I felt I was in the company of several to whom I could bow the knee without humiliation. My mind went back to Dr. Sharpe and to the first Dr. Meade, both Fellows of the Royal Society; and then to the late Dr. John Bell, Dr. Goyder, and others who demonstrated that woolsorters' disease was due to the anthrax bacillus. Also to the late Sir Thomas Stephenson, who became adviser to the Home Office in medical jurisprudence, and who, by his expert evidence, brought many criminals to justice. Then to the most kind-hearted little man I ever knew, the late Dr. Major, an expert in mental disease, one whose whole desire in life was to help everybody. In later days there remains with us the memory of Dr. James Kerr, who left Bradford to become the medical officer of the London School Board—a brilliant scholar, who never realised how brilliant he was even when it was impressed upon him by others. Perhaps I ought not to say anything about those who still remain with us, but I am tempted to express my admiration for the long and patient work which has been given to the effort to discover a sure means of disinfection of wool without destroying its commercial value, and I hope that this will one day obtain success and a well-deserved recognition.

Bradford is essentially a commercial centre, and its citizens respect everyone who advances commercial prosperity. They are enthusiastic in promoting education which has a practical and not merely an academic value. Nevertheless, it is a curious fact, if history be true, that the city owes much of its prosperity to a clergyman. The invention of the power loom emanated from Dr. Cartwright, a Fellow of Magdalen College, Oxford, afterwards incumbent of Brampton in Yorkshire and Prebendary of Lincoln Cathedral. Incidentally, he married an heiress and perhaps she, too, did much to make that invention possible. Thanks to the late Lord Masham's father, his memory is perpetuated by the Cartwright Memorial Hall in Lister Park.

My predecessor has handed on to me the difficult task of delivering a presidential address, and my only comfort is that you will not be allowed to express any criticisms upon my efforts. Reflections on the past and prophecies about the future are time-honoured but very hackneyed topics, but I am going to say something to-night about "The Yesterday, the To-day, and the To-morrow" of medicine.

I think that we are tending to lose our veneration for the past: perhaps we are too conceited about our present, and expect too much of the future. It is only human nature when most of us smile superciliously at the lack of scientific knowledge of our early medical ancestors and fail to appreciate the magnificent courage and perseverance with which they fought a losing battle against disease. Rudyard Kipling accurately described our modern mental attitude when he wrote:—

> "Wonderful little, when all is said,
> Wonderful little, our fathers knew,
> Half their remedies cured you dead,
> Most of their teaching was quite untrue."

But having written it, he pays them just tribute by adding :—

"Yet when sickness was sore in the land,
When neither planet nor herb assuaged,
They took their lives in their lancet hand,
And, oh, what a wonderful war they waged!
Yes, when the crosses were chalked on the door,
Yes, when the terrible death cart rolled,
Excellent courage our fathers bore,
Excellent hearts had our fathers of old,
None too learned, yet nobly bold,
Into the fight went our fathers of old."

The whole world of medicine has so completely changed that we can obtain no true perspective of those early times. The medical student of to-day cannot visualise the conditions against which his predecessors fought. In our eagerness to obtain scientific knowledge and our confidence in modern methods we are losing sight of the traditions of the past. Some of them may be quite untrue in the light of modern knowledge, but many of them still remain as a sure and solid foundation of good practice. Moreover, whatever we may think of the lack of knowledge in the early periods of medicine, there has been handed down to us a precept which every one of us might well adopt as a guiding principle in professional life. Two hundred years ago there lived a great French surgeon, Guy de Chauillac. His epitaph remains to-day as a motto for us all. He lived in a decadent period. He fought and successfully overcame many foolish and superstitious doctrines which were then in vogue. His life was a stormy one, a fight against prejudice and superstition, and when it ended, his service was recognised by an epitaph which he had truly earned :—

"Bold when sure,
Cautious in danger,
Kind to the sick,
Friendly with fellow-workers,
Not greedy of gain."

Knowledge is a priceless possession, but the mere acquirement of it derived from the labour of others goes a very short way towards the formation of a career which will give a lasting benefit to mankind. Moreover, it has an ever-varying and ever-changing value. What we take pride in to-day will be regarded as crude and foolish to-morrow, but that indefinable quality, character, and wisdom in the application of knowledge will make our memory live.

During the Victorian era two great discoveries were made which paved the way for the surgical triumphs of to-day. Strictly speaking, neither of them were discoveries, but rather the wise application of scientific knowledge to a practical use. The properties of nitrous oxide gas had been known long before it was suggested that its use might enable surgical operations to be performed during a period of unconsciousness. Pasteur's researches suggested to Lister that their practical application in surgery had great possibilities, and by his wise application of those researches he handed down to us an unspeakable blessing to humanity. It has been truly said that Lister by his teachings has saved more lives than Napoleon destroyed; and the introduction of the use of anæsthesia has given us the greatest of God's gifts—the relief from pain. Anæsthesia in surgical operations abolished the dread of pain; and Lister's application of the germ theory destroyed the spectre of septic infection. Every civilised nation pays homage to Lord Lister to-day, and no less to Pasteur. Their names are known and revered throughout the whole world.

It is a curious fact, however, that the circumstances of the birth of anæsthesia have been almost forgotten. Horace Wells, a dentist in Hartford, Connecticut, first conceived and put into practice the principle of inducing unconsciousness during dental operations by the inhalation of nitrous oxide gas. In December, 1844, he induced a friend to administer the gas to him for the extraction of a tooth, and encouraged by success he repeated the experiment on others. He subsequently gave a demonstration in Boston of his methods; but whether from nervousness, or from some other cause, the demonstration proved unsatisfactory and he was pronounced an impostor. Disheartened at length by the failure of repeated attempts to establish his claims, his mind became unhinged, and for a time he wandered about the streets in New York. On Jan. 4th, 1848, he was arrested on a charge of vitriol throwing, and while he was in gaol he committed suicide. Thus closed, at the age of 32 years, the career of Horace Wells, to whom at least belongs the credit of having first shown the practicability of producing unconsciousness by nitrous oxide gas, and of having thus, in his own words, established "the principle of anæsthesia."

The use of ether as an anæsthetic was introduced in 1846 by Morton, Horace Wells's partner. It was suggested to him by Charles Jackson, a chemist in Boston. Disputes as to priority arose, and Morton died, bankrupt and broken-hearted, after repeated efforts to secure recognition. Jackson, like Wells, became insane, and died in an asylum. Such is the tragic history of the birth of one of the two greatest benefits which have ever been bestowed on suffering humanity. It is recorded that the great American surgeon, Bigelow, after witnessing one of the early experiments in operating under anæsthesia, rushed out into the street exclaiming, "I have seen something to-day that will go round the whole world!" His prophecy has proved correct; but I doubt whether he realised the full extent of the meaning of his words. A short time ago it was proposed that a public memorial should be raised to Horace Wells in New York, but the municipal authorities declined to entertain the suggestion. This year the Lister Memorial block of the infirmary in Glasgow is being pulled down to make room for extensions and alterations. Am I not justified in saying that we are losing our veneration for the traditions of the past? It may be argued that Glasgow is only a very small corner of the world, and Lister's memory will always be revered throughout the whole universe. Nevertheless, while we boast to-day about all the wonderful feats we can and do perform, how many of us give a thought to the poor little dentist who first conceived the possibility of bringing them within our range.

The recent war introduced a period in the history of medicine during which everything was subordinated to the requirements of military service. It was a service which presented special problems and conditions of which we had no previous conception. No one had fully realised the enormous power of high explosives and the destructive capacity of all the devices of modern warfare. During the first few weeks of the war our confidence in the principles of our routine surgical practice were rudely shaken, and it was speedily recognised that special methods of wound treatment must be devised to meet the extraordinary conditions with which we had to deal. Those special methods were not long delayed. At the outset tetanus and gas gangrene threatened to produce an appalling mortality amongst the wounded. In a very short space of time, thanks to the adoption of preventive inoculation, deaths from tetanus became a negligible quantity. At the same time a special surgical technique, almost grotesque in its extravagance, was devised to prevent the occurrence of gas gangrene, and this most terrible and fatal form of wound infection soon became little more than a nightmare of the past. I had the privilege of serving in the Mediterranean force during the second and third years of the war. I never saw a single case of tetanus, and I can only remember one fatal case of gas gangrene. Our victory over these scourges of every army in past history was gained by methods which were inspired by the teaching of two men, Pasteur and Lister. If there is nothing else which should bind England and France together in a bond of everlasting friendship, surely the memory of these two men is sufficient to make us realise that humanity owes a great debt to both nations, a debt which the world can surely never forget.

I do not think, however, that our recent military experiences have done much to advance our usefulness

in dealing with sickness in civil life. The demands of war service, the urgent necessity for getting men back into the firing line, or of discharging them from hospital in order to make room for others, created a perfect orgy of exaggerated methods of treatment. Mr. Hamilton Russell, of Melbourne, truly wrote a few years ago: "The present methods of wound treatment have arisen largely by reason of the special character of war injuries as distinguished from those seen in civil practice. The injuries of civil life, however, remain what they were before, and it is necessary to exercise a wise discretion in introducing methods appropriate to war injuries into the much milder type of cases usual in civil life."

The whole war period brought into focus an exaggerated idea of the importance of surgical technique, and cramped the development of surgical judgment. The treatment of every injury and every disease became standardised, and each was passed through the same mill without consideration of qualifying circumstances. It was a bad training for the newly-qualified student of medicine. He was forced to deal with cases and not with patients, and my own personal experience convinced me that the loyal service which our young men so gladly gave to the nation impaired their subsequent usefulness in civil life. Each became a mere cogwheel in a great machine designed to fulfil a special purpose. During the most impressionable period of their career they worked amongst all the sensational excitement associated with military service, and "the daily round and common task" of civil practice is now an irksome experience for them. Hence is largely derived the widespread desire to practise some form of specialism. Specialism has become an idol which all and sundry worship. Not very long ago a well-known teacher in a great London school deplored this modern tendency in medicine. He said: "Everything is becoming divided into special classes and clinics, and the lecturer deals with his students as embryo specialists in the subjects in which he himself is expert. The necessary solid foundation of general knowledge upon which specialism should be built is receiving too scant attention, and the rising generation is being taught to run before it has learnt to walk." The late Sir William Macewen, whose recent death we deplore, once said, "No one can become a good surgeon unless he is first a good physician." It is an axiom which we should never forget, and it behoves every one to equip himself with a wide knowledge of general medicine before attempting to launch his boat upon the stormy sea of operative surgery. To the layman the term specialist has become a cabalistic word which he repeats upon every possible occasion. There is, however, one specialism which he frequently fails to appreciate at its proper value—the specialism of general practice. It requires more knowledge of human nature, and more experience over a wide field of observation, to make a really first-class general practitioner than the public has any cognisance of.

It would be absurd to depreciate the value of the many scientific methods of investigation which are available at the present time, but I am sure that a too ready appeal to them is doing much to destroy the initiative in the younger generation to think for themselves. Clinical observation threatens to become a lost art. Radiography and all the modern scientific methods are good servants but bad masters. There is a whole world of wisdom in an anecdote I heard recently. A patient presented himself before a surgeon, armed with a bundle of X ray photographs and reports of various kinds. The surgeon put them all on one side and said; "We will look at these presently, but in the meantime just get on to that couch and I will endeavour to find out what you are suffering from. After that, all these things *may* help to prove whether I am right or wrong."

I would insist, therefore, that our present failing is an over-confidence in modern technique and a lack of appreciation of the value of that wisdom which can only be obtained by personal observation and experience. I would urge the younger generation to think more and observe more for themselves, as their forefathers did, and not be so ready to bow the knee in a fanatical worship of so-called scientific methods of investigation and treatment. I would ask them to reflect on all the special methods which have been put forward during the past 35 years, from tuberculin down to deep X ray therapy for cancer, to realise how many have failed to stand the test of experience, and to reflect on all the bitter disappointments which have been inflicted by the thoughtless optimism with which each has been advocated. Our scientific knowledge has been greatly advanced, but knowledge avails us very little unless we cultivate the wisdom to gauge its practical value and apply it usefully:—

> "Knowledge and wisdom, far from being one
> Have oft times no connexion; knowledge dwells
> In heads replete with thoughts of other men,
> Wisdom in minds attentive to their own.
> Knowledge is proud that he has learned so much,
> Wisdom is humble that he knows no more."

What of the future? The day is coming when it will cease to be said that—

> "We are afflicted by what we can prove,
> We are distracted by what we know,"

because we shall obtain presently a truer perspective of the scientific methods of to-day. Experience, begotten by patient observation, will teach us their real value and their limitations. Some will be discarded, some may become a sheet anchor in times of doubt. Each will add their quota to our knowledge if they be wisely used, and not merely applied empirically just because they appeal to the popular craze of the moment. We must each play our part by developing our personal observation and experience, and not be content to invoke specialisms to solve those problems which we ought to decide for ourselves. If we do that we shall each add something to the sum of human happiness; and that, after all, is the one thing worth living for. Then when we have grown old, and the world has forgotten what we have done in the past, we shall find comfort in that consolation which has been given to every one who has striven to do his best:—

> "When earth's last picture is painted, and the tubes are twisted and dried,
> When the oldest colours have faded, and the youngest critic has died,
> We shall rest; and faith we shall need it, lie down for an æon or two
> Till the Master of all good workmen will put us to work anew.
> And only 'The Master' shall praise us, and only 'The Master' shall blame,
> And no one shall work for money, and no one shall work for fame,
> But each for joy of the working, and each in his separate star,
> Shall paint the things as he sees them for the God of things as they are."

An Address

ENTITLED

IS THE STATISTICAL METHOD OF ANY VALUE IN MEDICAL RESEARCH?

Delivered in the Institute of Pathology and Research, St. Mary's Hospital, on May 22nd, 1924,

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I RECOGNISE that there is a touch of disingenuousness in my choice of title; few human passions are stronger than vanity, and there are not many men whose love of truth is so compelling that they can stand up and confess to their fellows that the studies to which they have devoted many years are futile. I am not one of those rare spirits; the fact that I ask this question implies that I think I can answer it affirmatively, so I am an advocate, not a judge. But this I can plead in extenuation; my opinion of the statistical method has changed in the 20 years during which it has been my principal study; in some ways I value it more, in others less, than I did

as a youth; perhaps as candid an account of my present position as unconscious vanity will allow me to make will help others to assess fairly the value of the statistical method.

THE GENERAL CASE AGAINST MEDICAL STATISTICS.

It is generally agreed that statistics of a sort are useful to the medical profession; that, for instance, it is desirable to compute and publish death-rates and records of infectious diseases. But many research workers would deny that data of this kind either ever have been made or ever could be made the subject of a scientific investigation apt to reveal new and important truths, in the sense that the data of experiment can be made to disclose the secrets of nature. Let me try to state the grounds of such an opinion as forcibly as I can.

The medical statistics of any country can, at best, only reflect the opinions of its practitioners of medicine; at worst, they may be a mere translation into figures of the hearsay of laymen, possibly of drunken and venal old women—Graunt's view of the sources of vital statistics in the seventeenth century. Medical statistics between the best and the worst—that is to say, as they are compiled in most civilised countries—record not all the candid opinions of certifying practitioners, but some of their opinions. So long as medical practice is individualistic and death certificates are open to the inspection of the friends of the deceased—as they are in England and Wales—there is some motive to refrain from recording any opinion which may either hurt the credit of the practitioner in the eyes of his clients or do violence to common human sentiments. To subject documents of this order of accuracy to elaborate mathematical manipulation is surely trifling. "How and why did this man die?" is the most tremendous of interrogatories. To answer it fairly and fully may require knowledge and insight which no man has ever had, not Hippocrates, not Sydenham. Our medical statistics are the coding of answers given not by Hippocrates and Sydenham, but by men of only ordinary ability and insight, some ignorant, some biassed. "Dix millions d'ignorances," said Taine, "ne font pas un savoir." No calculus will transmute a million inaccurate verbal statements into an exact numerical appraisement. Can we deduce from this codification of half-truths anything at all which we might not have reached by plain good sense and observation without arithmetic? The Registrar-General tells us that 44,789 persons died of "influenza" in 1919, 112,310 in 1918, and only 7283 in 1917. We needed no statistics to convince us that "influenza" was a great pestilence in 1918, a serious cause of illness in 1919, and relatively unimportant in 1917. The Registrar-General does, indeed, tell us many things we did not know. He says that 29,777 persons were reported to have died of "old age" in 1919, and that four of these ancients were between 45 and 50, 14 between 50 and 55, and 59 between 55 and 60. We also learn from him that "old age" was epidemic in 1909; 33,975 people succumbed to it in that year, but it was much less virulent in 1913 when only 29,801 were cut off. Certainly we did not know these facts until the Registrar-General told us of them; indeed, we do not know them now. Putting it bluntly, what is true in his records is not new to any observant man, and what is new is probably not true. That, I think, is a fair statement of the objections many feel but few express, because, nowadays, statisticians, even medical statisticians, are quite respectable people. Now let us see whether the objection can be met, and met upon ground which is as unfavourable as can well be chosen—viz., the ground of the seventeenth century.

GRAUNT AND SYDENHAM.

Contemporaneously in London in the seventeenth century two men endeavoured to elucidate the natural history of disease. Each used the same figure of speech and supported it with the same authority. The one averred that "The Observations which I appened to make (for I designed them not) upon the Bills of Mortality, have fallen out to be both Political and Natural, some concerning Trade and Government, others concerning the Air, Countries, Seasons, Fruitfulness, Health, Diseases, Longevity, and the proportions between the Sex and Ages of Mankind. All which (because Sir Francis Bacon reckons his Discourses of Life and Death to be Natural History . . . .) I am humbly bold to think Natural History also, and consequently that I am obliged to cast in this small Mite into your great Treasury of that kind."[1] The other, desiderated, "primo Historia, sive morborum omnium descriptio quoad fieri potest graphica et naturalis," and said that, done so that "evitetur censura quam clarissimus Verulamius in nonnullos ejusmodi promissores vibravit," it would be a task not easy of fulfilment.[2]

One of the two was a London tradesman, John Graunt, the other, Thomas Sydenham, *medicus in omne ævum nobilis*. One based his natural history upon tables of figures compiled from the reports of "ancient matrons" whose diagnostic powers were, he thought, affected by the "mist of a cup of Ale and the bribe of a two-groat fee." The other's data were his own careful observations through 20 years of practice in the capital.

Given two men so equipped for the discovery of truth, which was the likelier to find truth, to make known natural historical facts apt to stimulate further research and so lead to further discoveries? Surely the answer is, Sydenham. But if we were to select from the host of natural historical facts of mortality, a fact *now* trite enough, but a novelty 200 years ago, one fact which has inspired more sanitary effort and more laboratory investigation than perhaps any other, it would be, I think, the enormous excess of mortality in childhood in large cities. One of our two natural historians of disease revealed that fact. He said: "We shall find that about 36 *per centum* of all quick conceptions died before six years old." . . . "When I consider, that in the Country 70 are born for 58 buried, and that before the year 1600 the like happened in London, I considered, whether a city as it becomes more populous, doth not, for that very cause, become more unhealthful: and inclined to believe, that London now is more unhealthful than heretofore; partly for that it is more populous, but chiefly because I have heard, that 60 years ago few Sea Coals were burnt in London, which are now universally used."

These are the words not of Sydenham but of Graunt, and how "the observations which I happened to make" led, directly and immediately, to the foundation of scientific methods of life assurance and, indirectly, to the establishment of those national registers of life and death, without which the work of Simon, of Chadwick, of Buchanan, of Power, and of Shirley Murphy could never have been done, is an oft-told tale. To "the observations which I happened to make" may be traced the inspiration of bacteriological researches carried out by men who never heard the name of Graunt.

What inspiration have modern investigators derived from Sydenham? I do not ask what our debt to him might have been had we been wise enough to invest some of the intellectual money he gave us, but what we *actually* owe, what great discoveries made since the seventeenth century are to be directly traced to Sydenham's inspiration. I think the answer is—none whatever. No great intellect is wasted; Sydenham has, perhaps, a debtor still unborn who will make something of "Epidemic Constitutions."

> "That low man seeks a little thing to do,
> Sees it and does it;
> This high man, with a great thing to pursue,
> Dies ere he knows it."

Sydenham was the high man, if you please, and Graunt the low man, but what he sought to do he did do. It is fine to have a soul above mere shop arithmetic, but perhaps unless one does cloak the humanity of one's patients in the guise of mere ciphers and averages, flesh and blood will be too much for us and our interest in the individual happenings

will prevent us from discerning the general laws of the collectivity. Perhaps the old London tradesman might have used of his method the words of a physician whom Sydenham loved: "Ὅστις δὲ ταῦτα ἀποβαλὼν καὶ ἀποδοκιμάσας πάντα ἑτέρῃ ὁδῷ καὶ ἑτέρῳ σχήματι ἐπιχειρέει ζητέειν, καὶ φήσει τι εὑρηκέναι, ἐξηπάτηται καὶ ἐξαπατᾶται· ἀδύνατον γάρ. (He who, casting aside and rejecting all these methods, essays to find truth by another path and with another method and proclaims that he has discovered something is deceiving and deceived. The thing is impossible.)

IS THE STATISTICAL METHOD EXHAUSTED?

But my candid critic may accept all this and still refuse to recognise the modern statistician as a scientific investigator. He will say: "I am quite prepared to recognise that Graunt and those inspired by him did valuable work. I agree that it *was* necessary both for honest propaganda—for calling attention to the existence of great evils which might be remedied—and even for suggesting fruitful topics of *real* research, that systematic vital statistics should be compiled and published. But in the preparation and interpretation of these statistics, one needs no more than plain good sense. Because the results of their labours are useful, the compilers and analysers of these statistics are no more entitled to rank as scientific investigators than are the equally useful artisans who manufacture our laboratory apparatus. Indeed, when I glance at the pages of acrimonious dispute between rival statisticians touching the scientific claims of different 'coefficients' I am reminded of Sam Johnson's remark: 'Sir, there is no settling the point of precedency between a louse and a flea.'"

Let us consider these two perfectly reasonable contentions: (1) That there is, properly speaking, no special method or art of medical statistics, plain good sense is all that is required; (2) that there is no longer any scope for originality in statistical research, that now, after all these years of tabulation and publication, statistics are on the plane of repetitive semi-skilled manufacture.

THE TERRIBLE RESULTS OF COMMON SENSE.

Is it a fact that a man of good sense can be trusted to interpret statistical data without either special training or (as in Graunt's case) special ability? In 1801 Dr. William Heberden the Younger published "Observations on the Increase and Decrease of Different Diseases." Heberden was something more than a mere man of good sense; he was a scholar, an experienced physician, and had family interest in medico-statistical investigations. His father, one of the most famous of eighteenth century physicians, financed a continuation of Graunt's work by Corbyn Morris. Heberden, then, went over the ground fairly acquainted with his predecessor's work and reached a conclusion which attracted a good deal of attention; he said, "there is scarcely any fact to be collected from the bills of mortality more worthy the attention of physicians than the gradual decline of dysentery." Heberden took together the three titles, bloody flux, colic, and griping in the guts, he showed that the annual average was more than 1000 in the first decade of the eighteenth century, fell to 770, to 700, to 350, 150, 110, 80, 70, 40, and finally 20 in the decade 1790–1800. He attributed this decline to greater cleanliness and better ventilation. But, as Creighton pointed out,[3] Heberden had simply made a statistical mistake; he had supposed "griping in the guts" to be dysentery when it really meant infantile diarrhœa; he made this mistake by overlooking the age-incidence of the deaths assigned to griping in the guts and did not notice that the total had been gradually transferred to the rubric convulsions. He *did* notice that the numbers assigned to convulsions had increased, but explained it by the transfer to this heading of chrisomes and infants, but did *not* remark (*a*) that transfer had been made already while convulsions were still a small total, (*b*) the gross total of chrisomes and infants was never large enough to make a difference of the required order of magnitude. If you compare Heberden's treatment of this case with Graunt's treatment of the question of whether rickets were a "new disease" in or about 1634, I think you will have no difficulty in deciding that Graunt did have a critical faculty which is really something more than simple good sense, and that a very sensible man like Heberden may blunder badly.

It would be easy enough to mention examples more recent than that of Heberden. Such mistakes look very foolish *when they are pointed out;* but a dozen of them will be made by very intelligent men within a year. I think we may accept the proposition that there is a kind of statistical tact, which is rather more than simple good sense; some are born with it, like Graunt; the rest of us have to acquire it. The second point raised by my objector is worth more consideration.

I wish to consider it under two subdivisions—first, when we confine the scope of the statistical method to what Graunt modestly called his shop arithmetic or to developments of that shop arithmetic which would have been quite intelligible to him; secondly, when we bring into the account a modern calculus which would have been almost as hard for Graunt to understand as it is for many, even laboratory workers, in the twentieth century.

LIFE-TABLES.

I choose as an example under the first heading the case of life-tables. Graunt made the first life-table, and the difference between the last English life-table, with its serried ranks of numerals, and the few figures of Graunt is of detail, very important detail of course, not of principle. A life-table purports to tell us how many of a fictitious population born at the same instant will live, 0, 1, 2, &c., years and has been used for two main purposes. The first, to provide a basis for commercial transactions, to make it possible to buy and sell equitably life annuities, assurances upon lives, and other similar conditional payments; the second to effect a summary and graphic comparison between the states of mortality in different communities or different occupations. In *medical research*, in the sense in which most of this audience understand that term, it has been used by very few. In England, my friend, Dr. John Brownlee,[4] is perhaps the only medical man who has devoted close attention to its possibilities as an instrument of research. I am aware that Bardolph was not thought a good security for Falstaff, so I shall not dwell, as I should like to do, upon the researches of a fellow medical statistician but call a witness from the respectable and unstatistical pages of the *Zeitschrift für Allgemeine Physiologie*. In 1921, August Pütter,[5] of Bonn, published an essay in which he argued that the immense literature dealing with the physiology and pathology of the duration of life, a literature to which such men as Weismann and Rubner have contributed, suffers from the lack of any clear idea as to what really is being investigated. He observes that we know more about the course of life in man than in any other animal, and suggests that it would be just as well to start by learning what there is to be learned from life-tables.

Pütter brings to the subject a fresh mind, and, like an intelligent man, sets his imagination to work to discover a *law* of mortality—i.e., some mental shorthand which will describe the increase of mortality with age. He is interested in the physiological problem of senescence, and so he only considers increasing mortality—i.e., from adult age onwards. As a laboratory worker would naturally do, he first takes the analogy of the destruction of bacteria by a disinfectant and considers the law of decrement which describes that case, the logarithmic law, the expression of the waning of a population opposing a constant power of resistance to a constant force of destruction. He suggests the combination with this of a law of geometrically increasing destructive power, so the law of human mortality he finally reaches is compounded of two factors, (1) which measures a

constantly acting force, his *Vernichtungsfaktor*, (2) the other measures the increasing lability of the tissues and is the *Alternsfaktor*. He shows that the mere arithmetical average called the expectation of life or mean duration of life in any population must be a function of both these factors, but notes that it is only the second which is of importance in the physiological study of senescence. After displaying some arithmetical examples of his proposed formulæ, he writes: "These reflections suffice to make it clear that physiology has no use for the statistical concept of the mean after life-time, but that, on the other hand, from precisely the same data from which statistics draw the concept of a mean after life-time, that is, from the mortality or survival table, physiology can deduce an important concept, the concept of a factor of senescence" (op. cit., p. 25).

As I said at the beginning we are all vain, and it is hard, even for physiologists, to believe that their thoughts had passed through the minds of dead men who were perhaps not even physiologists. Pütter's idea *may* have occurred to de Moivre or one of the Bernouillis (most good statistical ideas have), and it was at least clearly and fully expressed 99 years ago by Benjamin Gompertz [6] who held "it possible that death may be the consequence of two generally coexisting causes; the one chance, without previous disposition to death or deterioration, the other a deterioration, or increased inability to withstand destruction." Gompertz had in mind a law of mortality to express both factors, although he actually proposed one only covering the second—Pütter's *Alternsfaktor*—and a formula, including both a *Vernichtungsfaktor* and an *Alternsfaktor*, was introduced into actuarial practice only 65 years ago by Makeham, and is now termed the Makeham-Gompertz law. It differs in technical detail—for the better—from Pütter's formula, but it seeks to embody precisely the same idea. But although the idea of Pütter, or Gompertz, has been public property for nearly a century, no *physiological* use has been made of it, save by Dr. Brownlee. Dr. Brownlee has pointed out the significance of the formula from the physico-chemical point of view, and made it the basis of reflections which I am too ignorant of physical chemistry to appraise. I have looked at it from a much humbler standing-point. My line of thought was this. Suppose one accepts the suggestion that mortality is fully determined by two factors in Pütter or Gompertz's sense, then are they sufficiently separated by the Gompertz-Makeham "law" for any useful comparison of the strength of the forces at different epochs to be possible? In a general way we know that the environmental conditions of this generation are more favourable than those of our great grandfathers, that many causes of death and illness which were powerful in the eighteenth century are now almost negligible; typhus is extinct, typhoid obsolescent, tuberculosis greatly less fatal than 100 years ago. The death-rate of 1924 will probably not be as much as 50 per cent. of that of 1774. But it does not follow that the natural rate of tissue senescence has changed; that if the environment were perfect men of our generation would live longer than men of the eighteenth century placed under ideal conditions would have lived.

Let us see whether we can test this by the life-table method. The earliest life-table for an English population which is suitable for comparison is that known as the Carlisle table, and was based upon the mortality of part of Carlisle in the years 1779–87; the most recent national table is English Life Table, No. 8, based on the mortality of 1910–12. The Makeham-Gompertz constants of these tables have been calculated, those of the Carlisle table long ago, those for English Life Table, No. 8, by Mr. Trachtenberg,[7] and if we compare the values of the *Vernichtungsfaktoren* in the two tables we find that of the Carlisle table no less than three times as large as that of English Life Table, No. 8. Now let us see how long life would have been under each experience had the *Vernichtungsfaktor* been obliterated. By the nature of the assumed law of senescence, a geometrical rate of increasing destruction, there is no point of age at which *all* will be dead; theoretically some of Mr. Shaw's immortals exist, but we may calculate the age at which the original population will be reduced to one-thousandth or one-millionth, or any desired fraction of its initial number. I find, then, that the age at which only one in a million of those who lived to be 20 would still be alive supposing only the *Alternsfaktor* operative is for the Carlisle experience 105·8 years. For the England and Wales (Makehamised) experience of 1910–12 it is 104·7 years—that is, almost the same. I repeated the experiment on the English Life Table, No. 5, experience of 1881–90 as Makehamised by Mr. Trachtenberg; this table has a *Vernichtungsfaktor* greater by 78 per cent. than that of 1910–12, but the *Alternsfaktor* is again sensibly equal to the others, the one in a million survival age, when the *Vernichtungsfaktor* is abolished is 105·2 years. I made a similar comparison of the national Swedish life-tables for the experiences of 1816–40 and 1901–10 (I obtained the Makeham-Gompertz constants by a rough but sufficiently accurate approximation). The change in the *Vernichtungsfaktor* was not so great, a difference of 21 per cent., but it was considerable, the ages of survival on the stated hypotheses were 104·7 years and 105·5 years. Having reached this point and having further noted the fact that the general run of the *Vernichtungsfakoren* for the Swedish life-tables (eight of which are available) is concordant with the fluctuations of the public health of that country through the nineteenth century, I might be tempted to assert categorically that by a study of life-tables one can (*a*) deduce the quantitative measure of improvement in environmental conditions; (*b*) conclude that the physiological rate of senescence is invariable and that the human span of existence is under no circumstances whatever likely to exceed 110 years. But a little wider induction shows how foolish such a statement would be. Returning again to Mr. Trachtenberg's useful collection of Makehamised tables, we note that although what I have called the *Vernichtungsfaktor* is usually smaller the more favourable the general mortality, it is not always so. Thus he has computed the constants for the 1911–12 experience of London, of the county boroughs, of the urban districts, and of the rural districts. In this series the lowest *Vernichtungsfaktor* is that of London, the highest that of the rural districts, 156 per cent. of the value for London. But London's mortality was not so favourable as that of the rural districts; the mean after life-time at age 20 was 47·08 years on the rural experience, 42·35 years on that of London, and, of course, no sensible person would believe that the general environmental conditions of the rural districts are half as bad again as those of London. There are, at least, two reasons for this discrepancy. The first, that the so-called law only approximates crudely to the description of the natural facts; the second, that we have not got the "facts." These life-tables are not, what some people still seem to think them, records of the way in which men have really died; they are records of the way in which men would have died had they been subjected to conditions to which no real men ever have been simultaneously subjected. The English life-table for the "experience" of 1901–10 does not record the way in which the males of England and Wales died in 1901–10, but the way a hypothetical population would have died out had it been subjected to the *average* forces of mortality prevalent in that epoch. This artefact possibly, indeed probably, does not differ very widely from the truth, only attainable if we had a life card for every person born—a perfectly attainable ideal. But it would not be very sensible to spend much ingenuity in inventing more complex mathematical "laws" of mortality for the sake of representing more closely such data. But even with our crude mathematical hypothesis and our imperfect material we have gained something—viz., a new point of view, and from that new point we see various possibilities of research. Sir Almroth Wright has spoken of the profound importance of a good technique in the

searching out of nature; the equivalent of technique in the mathematical sciences is *notation*, and the history of knowledge has shown that the discovery of a good notation is so important that, with a good notation a second-rate man may go further into the arcana of nature than a first-rate man can penetrate with a bad notation. Now the *notation* of the life-table is exceedingly good. One proof of that assertion is that the notation used in seemingly unrelated cases will help us to discovery. I may be permitted to give a trivial example. During the war there was a good deal of concern over the wastage of labour in munition factories, very wild statements were made as to the numbers of new hands it was necessary to engage in order to maintain a constant strength of workers, and as to the effect of various measures in increasing or diminishing the rate of loss. I was instructed to investigate the subject and thought that one might liken entrance to and exit from a factory to birth and death, and construct factory survival tables formally and notationally analogous to life survival tables.[8] Having once got the idea, its application was simple if laborious, and we not only solved the problem originally proposed—viz., to determine the actual rates of wastage and the effects upon such wastage of changing the environmental conditions—but we were able to show that when, as happened at one time, the output of munitions of a particular type exceeded the demand, there was no need either for dramatic discharges or curtailment of hours, that if merely the industrial birth-rate were reduced to zero by refraining from the engagement of new hands, the population would be reduced to the required dimensions by the operation of the industrial "death-rate" in such-and-such a time. By the application of the life-table method it was quite easy to solve what appeared to be an extremely complicated problem.

This is a trivial illustration; reference to the papers of Prof. W. W. C. Topley [9] suggests far more important applications. This is, indeed, the point to which I have been bringing you by devious paths. I said at the outset that my conception of the statistical method in medicine has changed in the last 20 years; this is especially so with regard to the bearing of statistical method upon experiment. I used to see in the statistician the critic of the laboratory worker; it is a rôle which is gratifying to youthful vanity, for it is so easy to cheat oneself into the belief that the critic has some intellectual superiority over the criticised. I do not think even now that statistical criticism of laboratory investigations is useless, but I attach enormously more value to direct collaboration, the making of statistical experiments, and the permeation of statistical research with the experimental spirit. In this matter Prof. Topley is the pioneer. Topley has endeavoured to study *under laboratory conditions* the genesis and development of epidemics. Down to his time the subject has been examined in absolutely isolated fields. We have had on the one hand historians, public health administrators, statisticians wholly occupied with the records of occurrences of epidemic disease in nature; we have had on the other laboratory workers sedulously investigating the biological properties of the *materies morbi* and searching out the immunological properties of the living tissues of men and other animals. Between these two groups there has been little coöperation, the sanitarians have often drawn on themselves the contempt of the trained laboratory worker by a certain rashness and even amateurishness in their exploitation of laboratory results; the laboratory workers have sometimes displayed an equal crudity in their interpretations of the facts of sanitary history. It has not been recognised that the complex of phenomena in the world of humanity is so vast and the accuracy of the historical record so poor that there is little hope of solving any epidemic problem by the statistical or historical analysis of records alone; there is equally little hope of solving it by the minutely accurate, small scale experiment which has been the fashion of the laboratory worker. We must observe a "population" less complex, less exposed to the play of varied influences than the world of men and women, but much more complex than any laboratory investigator before Topley and the staff of the Rockefeller Institute had dreamed of. But, from the moment that we envisage the possibility of studying an artificial epidemic, we are faced with the need of much greater knowledge of the physiology of the animals we shall use as our material, and of a notation to describe the results.

Topley has worked with populations of mice and has reached such tentative conclusions as these:—

> "We were thus forced to the conclusion that mice, among which an epidemic was spreading, were subjected to an increased risk of death if they were allowed to mingle with normal members of their own species. This conclusion was confirmed by measuring the rate of extinction of a mouse population, among which a given bacterial disease was spreading, according as it was kept in isolation or was subject to a steady immigration of susceptible individuals of the same species. . . . It would seem, then, that the survivors from one epidemic, though in apparent health, are carrying the parasites which caused the disease from which their companions died, and that when they come into contact with any considerable number of susceptible individuals of their own species a process is set up which leads to a fresh outbreak of disease. It seems clear also that these mice which have passed through one epidemic wave are now possessed of some increased powers of resistance to the disease in question, for they tend regularly to outlive the new arrivals in the cage. But this resistance is relative and not absolute, for they tend to die during the later stages of the new epidemic which they themselves have started. . . . We are led to the view that the immigration of healthy but susceptible individuals into a population which has recently emerged from a considerable outbreak of disease is just as dangerous to the community they enter as it is to themselves" (op. cit., pp. 65–68).

Topley reaches these conclusions by treating his data on the lines of a life or survival table; it is evidently the proper way to treat them. Before we can fully profit by experimental studies of epidemics we must learn much more about the course of life, apart from epidemics, in our population. While "laboratory animals" are only used as living culture media or animated test-tubes, people have not bothered about their sociology! In Rössle's [10] vast *referat* on *Wachstum und Altern* one seeks in vain for *any* precise observations of the course of life in animals other than man. He cannot go beyond the cautious conclusion that in such animals as have been "tolerably" (leidlich) studied one finds "a uniform decay of many organs and tissues" rather than a senile central nervous system in a young body (op. cit., p. 569). We have a survival table for one animal other than man—*Drosophila melanogaster!*—made by Prof. Raymond Pearl [11] (*Metron*, 1923, ii., 697).

We know very little of the trend of life in mice. Yet this is important. Prof. Pearl suggests that we can make an exact comparison between the life-table of a fly and the life-table of a human population by merely altering the unit; one year of human life is equated to 1·1279 days in the life of a fly. Suppose we take the common opinion that the average life of a mouse is two years, then a year of human life is equivalent, taking an average human life as 50 years, to about a fortnight, so by that method of reckoning an attack of, say, mouse typhoid ending in recovery is a matter of (humanly speaking) years. We know what a different business, say, a pneumococcal pneumonia is between 40 and 50 and between 20 and 30 from the prognostic standpoint. We have not sufficiently considered the possibility that this factor may be of importance in populations of laboratory animals. We *must* consider this and many other histological factors on statistical lines, with the notation of the life-table and Graunt's shop arithmetic. Such is my answer to the first part of the second question proposed so long ago that you have forgotten it. Using no statistical methods which would not have been intelligible to John Graunt, applying those methods to the controlled populations handled by Topley, it is probable, it is almost certain, that we

shall reach a clearer insight into the phenomena of epidemic disease than generations of unintegrated experimental and statistical work have achieved; armed with that knowledge, we may be able to interpret the record, both minute and defective, of human history.

THE NEW STATISTICAL CALCULUS.

The second part of my question, what we are to hope from the new statistical calculus, I have left no time to answer fairly. I will only quote from an old book. Oesterlen[12] said:—

> "It may be regarded as the established result of experience that scrofula, rachitis, the formation of tubercles, and similar affections, occur most frequently in the children of the poor. Statistical indications of the same circumstance are also not wanting, but our insight into its immediate or remote causes is not furthered by them because they merely give us a certain total result, and do not enlighten us, for instance, as to whether those children fell sick from bad food and air, or from want of care, from hereditary predisposition, from bodily malformations, or from a syphilitic taint derived from their parents. All this we may hope to learn with more certainty as statistical comparison becomes more accurate and is better able to isolate some particular influence and determine its action upon any given case."

Oesterlen's prevision has been fulfilled. Even the most convinced adherents of the environmental as opposed to the genetic origin of ill-health will hardly deny that, for instance, Prof. Karl Pearson's investigations of the factors influencing the ill-being or well-being of children have given us a clearer insight into the rôles of different possible and probable causes of ill-health. Nature *does* present us with skeins not to be unravelled by the most habile experimenter, cases where the A, the B, and C *cannot* be studied in isolation. In these instances, the modern statistical calculus of correlations is, not indeed a key to all the mythologies, but a useful, an invaluable, tool.

As the immediate collaborator of the experimenter, collaboration implying that he will take pains to understand the work of the experimenter, even to do some of it himself, the medical statistician has, I submit, an important part to play in modern research. In the investigation of such phenomena as are, at first view, too complex for experimentation, he can do service, chiefly, I believe, in detecting by his calculus factors which might be made the object of a simpler but more exact experimental investigation. When I first took an interest in these matters, more than 20 years ago, there was some tendency to treat the statistician or biometrician as a pariah, and he acquired the virtues and vices of a minority, a certain courage and a certain trick of over-emphasis—they always characterise a fighting minority. Now, statistics and statisticians are perfectly respectable; there may even be a risk of putting the claims of the statistical expert too high. The time may perhaps come when a brilliant young mathematician, building higher on the mathematical foundations laid by Karl Pearson, will assert that in medical, or any other biological research, the judgment of the biometrician must be final; he must be the ultimate court of appeal. If that time comes, I shall be found enlisted under the banner of Sir Almroth Wright, and shall quote to the would-be dictator the words of Macaulay:—

> "I tell the honourable and learned gentleman, that the same spirit which sustained us in a just contest for him will sustain us in an equally just contest against him. Calumny, abuse, royal displeasure, popular fury, exclusion from office, exclusion from Parliament, we were ready to endure them all, rather than that he should be less than a British subject. We never will suffer him to be more."

The statistician must be the equal not the predominant partner.

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1. Epistle Dedicatory of Graunt's Natural and Political Observations, made upon the Bills of Mortality, Hull's edition of the Economic Writings of Sir William Petty, Cambridge, 1899, ii., 322.
2. Preface to third edition of Observationes Medicæ, Greenhill's edition of Sydenham's works, London, 1844, p. 10.

(*Continued at foot of next column.*)

OBSERVATIONS ON THE USE OF INSULIN.

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INSULIN is employed in diabetes with the object of making good a deficiency in the supply of the natural hormone of the pancreas in these cases. The ideal method of administering the drug would be to imitate as closely as possible the normal supply of the substance in the body. Unfortunately we are ignorant of the rate of secretion of insulin by the pancreas and whether the process is continuous or intermittent. It would seem probable, however, that a small quantity of the hormone is constantly being poured out, and that an extra amount becomes available when required, for example, after a carbohydrate meal has been taken. In any case the supply of insulin in normal individuals is such that the blood-sugar remains about 0·1 per cent. and is only raised to a slight extent by ingested carbohydrates. Diabetic subjects respond to carbohydrate food less perfectly, the lack of insulin allowing a much greater and much more prolonged increase in the blood-sugar, the percentage often rising to 0·3 or 0·4. The mildest cases of the disease show this exaggerated hyperglycæmia only after feeding, and their blood-sugar may return to the normal level between meals and during the night. In such patients a sample of blood taken before breakfast will give a normal reading. When the case is more severe, the phase of hyperglycæmia persists longer after each meal and may not pass off completely during the night. The fasting blood-sugar level is therefore high, and glycosuria is present during the whole 24 hours. Such a patient starts his day with a handicap; the blood-sugar, which already stands above the renal threshold, is further raised by each meal, and does not have time to subside far before the next food is taken. It will be seen, then, that the morning blood-sugar value represents the lowest point in the daily cycle in such cases, and when the patient is on a standard diet, the height of the fasting sugar level gives a rough guide to the severity of the case *at the moment*.

Effect of Diet on Fasting Blood-sugar.

The character of the diet that the patient is taking is also a factor in determining the height of his fasting blood-sugar. When he passes from a more meagre to a larger diet, the level of the fasting blood-sugar gradually rises from day to day until a new equilibrium is reached. The full effect may not be evident for some days after the food increase has been made. In the same way reduction of the food intake lowers the fasting sugar levels, a principle that has been made use of in the well-known Allen system. Again, the new level only becomes definitely established after a certain interval. Some patients become sugar-free on slight restriction of diet, others must be deprived of food for two or three days before the blood-sugar falls below the renal threshold level. From this it follows that the state of the blood-sugar and the quantity of sugar lost by the kidney only correspond to the food intake when the patient has been on a constant diet for several days. This fact serves to explain the frequent failure to find a relationship between the food intake and the degree of glycosuria.

(*Continued from previous column.*)

3. Creighton: History of Epidemics in Britain, Cambridge, 1894, ii., 748.
4. Brownlee: Jour. Roy. Stat. Soc., 1919, lxxxii., 34.
5. Pütter: Zeit. f. Allgem. Physiol., 1921, xix., 9.
6. Gompertz: Phil. Trans., 1825.
7. Trachtenberg: Jour. Royal Stat. Soc., 1920, lxxxiii., 656.
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9. Topley: Proc. Manchester Stat. Soc., March 14th, 1923, 57.
10. Rössle: Ergeb. d. Allgem. Path. u. Path. Anat., 1923, ii. Abth., I. Teil, 369.
11. Pearl: Metron, 1923, ii., 697; Biology of Death, Philadelphia and London, 1922, p. 186.
12. Oesterlen: Medical Logic, Sydenham Society's Translation, London, 1855, p. 113.

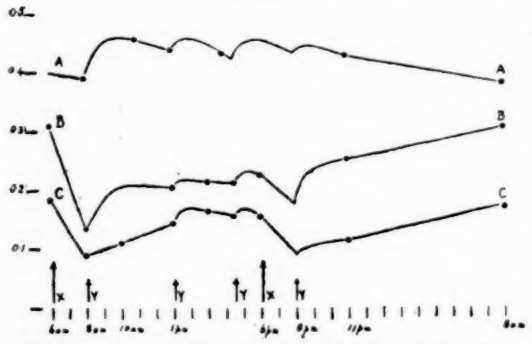
The slow change to a new level is doubtless due to liberation of stored carbohydrate.

The following figures, obtained from a moderately severe case of diabetes, give an idea of the fluctuation in blood-sugar values throughout the day:—

Observation	A	B	C	D	E	F
Hours	0	3	5	8	15	24
Sugar per cent. ..	0·39	0·50	0·44	0·43	0·43	0·38

A is the fasting blood-sugar reading taken at 8 A.M.; B was taken three hours after breakfast and should represent the maximum rise of the post-prandial curve. C and D were taken immediately before dinner and tea respectively. E was taken four hours after supper, and F is the fasting level next morning. The rises after dinner, tea, and supper were not observed but have been guessed at. (See Curve A, Fig. 1.)

FIG. 1.—*To show Changes in Blood-sugar Levels during 26 Hours.*



Ordinates show percentage of blood-sugar, Abscissæ hours. Insulin given to Cases B and C at 6 A.M. and 6 P.M. Case A received no insulin. Meals taken at points Y. Actual observations indicated by dots.

High blood-sugars of this sort lead to considerable waste of carbohydrate by glycosuria, and are also known to aggravate the pancreatic damage. It is therefore desirable to employ insulin in such a manner as to maintain the blood-sugar about the normal level at all times. How best to do this has not been decided.

Effect of a Single Dose of Insulin in a Diabetic Subject.

Insulin given subcutaneously to a fasting patient causes a somewhat slow fall in the blood-sugar during the first half hour. This phase is followed by a much more rapid decline for the next hour or hour and a half, but after the second hour the rate of fall again slows and only a slight further diminution in concentration takes place, although the effect persists for a long time. The minimum point is reached somewhere between the third and the sixth hours, and thereafter the blood-sugar values increase once more. A return to the original fasting level would take place were not the diminishing effect of several hours of starvation superadded. The whole reaction caused by 10 units of insulin lasts more than eight hours, and in many cases the effects are still noticeable 12 to 16 hours after injection.

The absorption and the utilisation of insulin is an example of "consecutive reactions" (as has been shown for adrenalin).[1] The rate of removal of the insulin from the site of injection is most rapid at first, when the greatest amount of the drug is present locally, and diminishes later. The amount of the substance in the blood will rise from zero to a maximum concentration, and during this period an increasing effect (blood-sugar fall) will take place. The slow preliminary decline in the blood-sugar values means that a certain time is required for the greater part of the insulin to come into action. Attention should be given to this point in determining the interval between the injection of the drug and the giving of the food it is designed to "cover." Although the quantity of insulin administered may theoretically account for the amount of carbohydrate taken, the rate of absorption of the food might outstrip that of the drug and so upset the calculation. Clinical experience has shown that other factors must be taken into account.

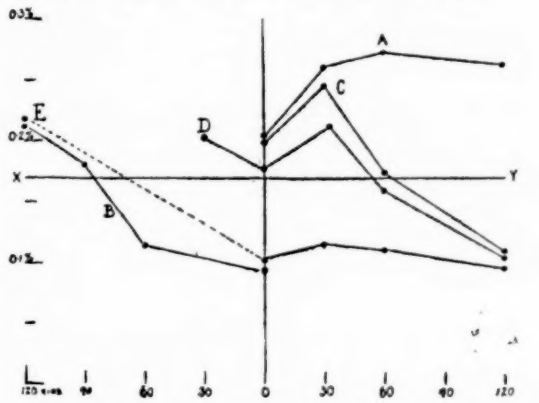
[1] Lyon, D. M.: The Absorption of Adrenalin, Jour. Exp. Med., xxxviii., 655.

Effect of Varying the Interval between the Administration of Insulin and the Taking of Food.

Little attention seems hitherto to have been given to this question, which appears to be of some importance. When a diabetic takes carbohydrate food his blood-sugar almost at once begins to increase, and rises rapidly to a considerable height. We have seen, however, that the full effect of insulin is not obtained until some half-hour or more after the injection has been given. It will therefore appear that a considerable rise of blood-sugar may take place before sufficient insulin is available to arrest the increase. During this interval glycosuria may occur even when the fasting sugar level has been normal. When the morning blood-sugar is high, as so frequently is the case in these subjects during the early stages of treatment, this loss of sugar in the urine may be of great importance. Even when the amount of carbohydrate and the quantity of insulin were so perfectly matched as to neutralise each other and the reaction commenced from a high fasting level, the subsequent blood-sugar value would still remain above the renal threshold throughout the whole absorption period, and much glucose would be lost. The use of larger doses of insulin might overcome these difficulties by hastening absorption of the drug, but this would add greatly to the expense of treatment.

Observations have been made on the blood-sugar changes and on the urine in patients taking a standard breakfast with a uniform dose of insulin *at different intervals* before the meal. The results are shown in Fig. 2. The breakfast when taken without insulin causes the typical excessive rise in blood-sugar (Curve A). If insulin is given and food is taken immediately afterwards the blood-sugar rises for a time, then falls again fairly abruptly, much earlier

FIG 2.—*To show Effect of Varying the Interval between Injection of Insulin and the Meal Following.*



A standard breakfast was given at the point 0; the figures on the abscissæ indicate minutes before and after commencing the meal.

Curve A, blood-sugar changes when no insulin was given. B, Effect of 10 units of insulin on the fasting blood-sugar. C, Breakfast and insulin taken at same time. D, Insulin given half hour before food. E, Insulin two hours before breakfast. X–Y, Normal level of renal threshold.

than it would if no insulin were given (Curve C). The fall often continues to a point well below the initial level, the actual degree of reduction depending on the original height of the blood-sugar, the amount of carbohydrate in the meal, and the dose of insulin employed. If an interval of half an hour is allowed the blood-sugar during that period diminishes slightly before the food is taken; a small temporary rise then takes place, to be followed by a greater and more persistent fall (Curve D). The effect of the carbohydrate intake on the blood-sugar is now less than in the former case, but the level may still rise above the renal threshold for a short time.

If a comparatively large dose of insulin is given immediately before a meal, or even half an hour before it, it is possible for glycosuria to occur during the temporary phase of raised blood-sugar, and for symptoms of hypoglycæmia to appear a short time afterwards during the subsequent fall of the blood-sugar. This occurrence of glycosuria in a patient who has regular attacks of hypoglycæmia is rather puzzling at first sight, but a thorough understanding of the blood-sugar changes readily explains it, and the matter can be easily adjusted by balancing the diet and the dose of insulin. When there is a space of two hours between food and insulin conditions are different. This interval is sufficient to permit the insulin to reduce the blood-sugar to within normal limits before the meal is given. The same quantity of food as was formerly taken now produces only a very slight and short-lived rise which does not reach the renal threshold, and the whole reaction indeed closely resembles that which would be produced in a healthy individual (Curve E). No sugar escapes and all the food is made use of.

For the past six months it has been our practice to employ an interval of about two hours between each dose of insulin and the meal which follows. By this plan glycosuria is avoided and the patient is able to make the fullest use of the insulin given. It was thought that although the two-hour interval was the most satisfactory to employ in the morning before breakfast when the fasting blood-sugar required to be brought down to the normal level, a shorter period between dose and meal might be sufficient throughout the day. When the point was investigated, however, it was found that shorter intervals at these times were less satisfactory than the two-hour period. If only half an hour was allowed the dose of insulin had to be increased to produce the same effect. For these reasons it is claimed that the maximum value of the drug is obtained—that is, the largest quantity of food can be "covered" by a definite quantity of insulin—if a period of about two hours elapses before food is taken. This becomes a very important consideration in severe cases of the disease when the amount of the drug available has to be limited because of the expense. A word of caution, however, is necessary at this point.

It has occasionally been found in very severe cases of diabetes of long-standing that on commencing treatment the first doses of insulin given two hours before food are followed by rather severe symptoms of hypoglycæmia, but that a few days later, under apparently the same conditions, no attack occurs. In explanation of this it is suggested that the effect of the insulin does not depend on the height of the blood-sugar alone, but also to some extent on the glycogen content of the tissues. The view has been taken that insulin creates in the tissues a vacuum for glucose. In these severe cases of long standing the tissues contain very little or no glycogen, and under insulin they are able to take in rapidly a very large proportion of the sugar circulating in the blood so that hypoglycæmia is easily induced within two hours. A few days later, when the glycogen content of the tissues has improved, the transference of glucose into them under the same dose of insulin is much less rapid and no symptoms occur in the two-hour period. It would therefore be desirable in *emaciated subjects*, when commencing the use of insulin, to allow an interval of only half an hour between the dose and the meal following for the first three days and thereafter to lengthen the interval to two hours as recommended above. As a matter of fact, cases of this type when first applying for treatment commonly show clinical evidence of acidosis, and attention is directed to treatment of this condition by pushing the carbohydrate intake and neglecting for the time the degree of glycosuria.

How Should the Daily Supply of Insulin be Distributed?

The object to be aimed at in employing insulin is to keep the blood-sugar within normal limits, not only during the digesting periods, but throughout the *whole 24 hours*. How can this be best accomplished?

The total quantity of insulin available may be given as one dose or may be broken up into several equal or unequal fractions to be taken over the day. The suitability of any one method depends to a great extent on the amount of the drug to be employed. Where the total quantity is small (5 or 10 units) it may be given as a single dose, but this method is unsuitable for injections of over 20 units. On the other hand, there are obvious objections to giving a large number of small doses in the day, although this plan would probably more closely follow the natural supply. It is usually found most convenient to divide the insulin into two or three portions. Large doses are much more liable to give rise to hypoglycæmia than smaller ones, so that even when a large morning dose of insulin is followed by a breakfast rich in carbohydrate an attack may be experienced before dinner-time. When all the insulin is given at one time the distribution of the food is less satisfactory, for the later meals in the day must be rather poor in carbohydrate. It is probable, too, that the effect of the single large dose of insulin on the blood-sugar will have worn off 24 hours after the injection. Equal fractions of the total daily supply are usually employed at each injection, but sometimes it seemed preferable to give a slightly larger dose in the morning before breakfast.

The action of the insulin on the blood-sugar can be followed in two ways, (*a*) by making frequent estimations of the blood-sugar, (*b*) by examining each quantity of urine passed. The former method is doubtless more accurate, but is distasteful to the patient and can only be carried out in well-equipped hospitals. Blood-sugar examinations are now no longer done as a routine for the purpose of controlling the patient's food intake. The second plan has a much wider application, and may even be undertaken by the patient himself. It consists in examining two-hourly specimens of urine from 6 A.M. to 10 P.M. and a collected sample for the hours of sleep. This method readily shows whether each meal is adequately covered, or whether it is too rich in carbohydrate, and correction of the food distribution then becomes an easy matter. Such urine examinations are of especial service when a patient who is taking insulin passes only a very small quantity of sugar in the twenty-four hours. Apart from those glycosurias due to toxæmia or to nerve hypertonus, traces of sugar in a sample of mixed urine for the whole day are either caused by the carbohydrate at one or other meal being in excess, or by the effect of the insulin wearing off during the night. Frequent sampling will show at once where the leak occurs.

When two or three doses of insulin are given during the day-time within a space of about eight hours (say from 8 A.M. to 4 P.M.) the influence of the last dose has disappeared long before morning, so that the blood-sugar values creep up during the night, and glycosuria occurs before breakfast. There seems to be a constant tendency for the blood-sugar in the diabetic to return to a high level after it has been lowered by insulin and when presumably all the "extra" mobilised sugar has been stored away. From this it might be inferred that the organism, lacking the normal quantity of insulin, is best able to make use of the glucose when it stands at this high level in

the blood. It may be that the greater concentration, or the greater head of pressure of the sugar, facilitates the transference from the blood-stream into the tissues—a mass action effect. When insulin is supplied, the sugar can be satisfactorily dealt with at a much lower pressure.

Early morning glycosuria proved very troublesome in certain cases until steps were taken to control the blood-sugar during the night as well as in the daytime. This was accomplished by separating the first and the last doses of insulin as widely as possible, allowing not more than 12 hours between the evening dose and the morning one. If the carbohydrate is fairly divided between the "protected" meals there is no danger of an attack of hypoglycæmia during sleep, since the after-supper increase of blood-sugar fills up the lowest part of the evening insulin curve. The presence of a third dose during the day does not affect the position of the other two doses. Failure to control the blood-sugar during the night leads to a high fasting blood-sugar in the morning, so that the patient begins his day at a disadvantage.

Frequent blood-sugar examinations in a series of insulin cases have helped to explain what happens. The following points were chosen for sampling: (A) Fasting level before insulin; (B) minimum value two hours after insulin and immediately before breakfast; (C) two hours after breakfast—to catch the height of the post-prandial curve; (D) level just before dinner; (E) maximum after dinner; (F) minimum before tea; (G) level before evening insulin; (H) value at 11 P.M.; (I) fasting level next morning. Meals were given at 8 A.M., 1 P.M., 4.30 P.M., and 8 P.M., the carbohydrate being principally in the breakfast and the supper, and insulin was injected at 6 A.M. and at 6 P.M. The results are shown in the following table (see also curves B and C in Fig. 1)

Table Showing Results of Blood-sugar Examinations in Insulin Cases.

	A (*a*)	B (*b*)	C	D (*c*)	E	F (*d*)	G (*e*) (*f*)	H	I
	6 A.M.	8 A.M.	10 A.M.	1 P.M.	3 P.M.	4.30 P.M.	6 P.M.	11 P.M.	8 A.M.
1	0·31	0·13	—	0·20	0·21	—	0·23	0·25	0·30
2	0·29	0·19	—	0·12	0·22	—	0·22	0·22	0·29
3	0·31	0·16	0·12	0·08	—	—	0·22	0·22	0·31
4	0·24	0·13	—	0·16	—	0·23	0·20	0·10	0·20
5	0·19	0·11	—	0·15	—	0·14	0·15	0·14	0·19
6	0·19	0·09	0·11	0·15	0·17	0·14	0·14	0·12	0·17
7	0·24	0·17	0·17	0·13	—	—	0·20	0·20	0·24

(*a*) Insulin, 6 A.M.
(*b*) Breakfast, 8 A.M.
(*c*) Dinner, 1.15 P.M.
(*d*) Tea, 4.30 P.M.
(*e*) Insulin, 6 P.M.
(*f*) Supper, 8 P.M.

In all cases the highest readings in the 24 hours are the morning fasting values, and when the diet is constant these figures tally fairly closely from day to day. Cases 1, 2, 3, and 4 were examined early in their course of treatment, and showed some sugar in the morning urine specimens. In the case of No. 4 the carbohydrate was arranged for three doses of insulin, but by an oversight the mid-day injection was omitted. This accounts for the very high figures in the afternoon, but the evening dose corrected the hyperglycæmia and the patient started the night with a very low reading.

A valid objection to the control of diet by urine examination alone is that the absence of glycosuria only indicates that the blood-sugar is being kept *below the patient's renal threshold*, and this level in diabetics is often in the neighbourhood of 0·20 per cent. or even 0·25 per cent. Allen's experiments in depancreatised dogs showed that continued hyperglycæmia caused further degeneration of the damaged islets of Langerhans, and clinical experience has amply confirmed this. Patients with persistent hyperglycæmia and glycosuria continue to go downhill, but in such cases the blood-sugar remains above the renal threshold. It is possible, however, that in long-standing diabetes the pancreas and other tissues, as well as the kidneys, have become acclimatised to work best when the blood-sugar level is slightly higher than normal, and that this slightly greater concentration does not lead to the same bad results in them. It may, of course, be simply a matter of degree. Certainly those patients whose diets are controlled by urine examinations alone show marked improvement as treatment proceeds. It has seldom been necessary to give moderately severe cases more than 25 to 30 units of insulin a day to keep them sugar free, to allow them to reach a satisfactory maintenance diet, and to enable them to put on considerable weight. Further, after the same diet has been continued for a time it is usually found that the fasting blood-sugar levels fall still lower and often become normal, while at the same time the dose of insulin required may be reduced to 15 or 10 units. Some fortunate individuals have been able to dispense with the insulin altogether before they left hospital. It would seem probable, therefore, that damage to the pancreas does not follow if the blood-sugar concentration is kept below the level of the renal threshold.

Significance of Fasting Blood-sugar Values.

It was pointed out above that alterations in the level of the fasting blood-sugar from day to day tend to lag behind the changes in diet which produce them. This is seen in two ways. An unexpected return of glycosuria may occur when a patient has been for some days on a fixed diet with a constant amount of insulin. The balance of food intake and insulin dosage appears to be satisfactory and no sugar is lost for two or three days. Then without alteration of either food or insulin the 24 hours specimen of urine will one day give a faint cloud with Fehling's solution. Next day it gives an olive-green colour when tested, and the day after a definite orange. These slighter changes in the urine-Fehling mixture are of considerable importance and are looked upon as the earliest sign that a return of glycosuria is threatened. Certainly, if no reduction of the diet is made on discovering such changes, definite sugar appears within 24 or 48 hours. This gradual return of sugar in the urine has been taken to mean that the amount of food eaten was a little too high for the quantity of insulin given, and has thus led to a slow rise in the fasting blood-sugar level from day to day until the renal threshold was passed and glycosuria became evident. Such a reappearance of a positive reaction with Fehling's solution is most likely to occur when the patient has left hospital and is trying to take as high a maintenance diet as possible in order to allow him to work. The return of sugar in the urine is always a disappointment to the patient, and should be avoided if possible. It is a good plan to insist on such a patient taking a lower diet once a week. Instead of his usual 2500 or 2800 calorie diet he drops for one day to 1200 or 1500 calories, at the same time continuing his insulin as usual. If hypoglycæmia threatens on such a low day the reduction in food is not necessary and the low day may be discontinued. The introduction of a half-ration day definitely reduces the fasting blood-sugar level and prevents it from ever reaching or surpassing the renal threshold.

The lag effect is also seen in the opposite direction. In certain cases, as treatment advances, the patient begins to find that he experiences slight symptoms of hypoglycæmia—hunger, slight flushing, perspiration, or shakiness—about 1¼ or 1¾ hours after the insulin has been injected. These symptoms may also appear for the first time after the patient has apparently been stabilised on a definite food-insulin balance for several days without having attacks. In this case the insulin is more than sufficient for the purpose intended. The appearance of these slight signs of hypoglycæmia indicates that the blood-sugar has fallen to about 0·7 per cent. or lower, and probably implies that the original morning fasting level was normal or only slightly elevated. All patients before leaving hospital are taught to recognise the signs of hypoglycæmia and how to cut

short an attack, so no harm results from the appearance of slight manifestations. When this stage of treatment is reached and the patient is experiencing slight attacks, several courses are open. The interval between the injection and the meal may be shortened. This avoids the appearance of the symptoms, and at the same time keeps the blood-sugar at a low level. Alternatively, the amount of food taken may be increased daily until the symptoms cease to appear; or thirdly, the diet may be kept constant while the dose of insulin is reduced. All these procedures have been followed as occasions warranted.

It has not yet been definitely decided whether in all cases an endeavour should be made to keep the fasting blood-sugar level as low as possible, or whether as good results are to be obtained by merely avoiding glycosuria. The former plan would seem to be preferable, at least for a time, during the earlier stages of treatment, but of course it requires larger doses of insulin. The question is often decided automatically by the economic situation, when it is necessary to obtain the maximum result with the smallest outlay.

Reliability of Commercial Insulin.

Considering that the only method at present available for the standardisation of insulin is a pharmacological assay of doubtful value, the uniformity of the strength of the insulin supplied is remarkable. It is rather easy to check the quality of a new sample on patients who have been under control for some time. As a rule, a definite dose of a fresh batch of the substance can be relied upon to "cover" as much carbohydrate as the last batch did. From time to time, however, sugar returns in the urine of "pedigreed" patients who have carefully followed out their usual régime. Were such instances isolated, it might be thought that the glycosuria was due to faulty dieting, intercurrent toxæmia, or passing nervous strain (worry, excitement, &c.) These failures, however, usually appear in groups, complaints being received from other wards and from out-patients who are using the same batch of the drug. Sometimes the strength appears to be little more than half the normal worth. Since errors may appear on the side of weakness, it is possible that some batches of insulin issued are over-strength. This fault would not be so readily detected, unless by the sudden occurrence of hypoglycæmia in cases where the fasting blood-sugar was being kept at a very low level. The tendency to occasional variability in the strength of the insulin must be kept in mind when an unexpected reappearance of glycosuria occurs.

THE TREATMENT OF TUBERCULOSIS WITH SODIUM MORRHUATE.

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A FEW years ago sodium morrhuate, a sodium salt of cod-liver oil, was introduced by Sir Leonard Rogers as a remedy for tuberculosis. I have found this remedy of great help in advanced cases, but not so successful as in the early ones, in whom it appears to lead to a complete arrest of the disease. It is easily administered by subcutaneous injection.

I usually begin with 0·5 c.cm., and if the reaction is only very slight, I proceed to a dose of 1 c.cm., administered twice weekly. There does not appear to be any advantage in using a larger dose. Sometimes a slight local reaction around the needle puncture is observed which is apt to occur if a month or so had elapsed since the last injection. It is used in a 3 per cent. solution obtainable in rubber-capped bottles. It is essential to let the bottle stand in warm water for a few minutes before use, when it should be clear and not the least muddy.

Descriptive Cases.

The following is an account of 11 patients treated by this method:—

CASE 1.—Mr. J. T., aged 28 years, had been ill for six months previous to seeing me in June, 1919, shortly after he had had slight hæmoptysis. His evening temperature was 101·5° F. There was consolidation of the left apex, night-sweats, and T.B. in sputum. Weight on commencing treatment 9 st. 2 lb. In September, 1919, the night-sweats had ceased. He was feeling stronger, and the T.B. were less numerous in the sputum. His weight was then 9 st. 11 lb. In December, 1919, there was no T.B. in the sputum, no cough, and weight was 10 st. 7 lb.

This patient received 59 injections, using in all 56 c.cm. of sodium morrhuate. In 1920 he went to America and has been working there since then as a traveller.

CASE 2.—Mr. A. C., aged 21. In January, 1920, he had consolidation of the right apex, dullness on percussion, and crepitations, night-sweats, and T.B. present in the sputum. Weight was 8 st. 11 lb. At the end of eight months' treatment no T.B. were found in the sputum, night-sweats had gone, and there were no crepitations. There was only slight dullness on percussion. His weight was now 9 st. 10 lb.

CASE 3.—Mr. D. T., aged 18, consulted me in March, 1920. He had consolidation of the left base, crepitations, night sweats, cough, T.B. in the sputum. Weight 9 st. 3 lb. After six months' treatment he felt well, percussion only slightly dull, no crepitations, cough, or night-sweats. Weight 10 st. 4 lb.

CASE 4.—Miss A. W., aged 20, had consolidation of the left apex, crepitations, with dullness on percussion. Evening temperature 101° F. She had T.B. in the sputum. At the end of six months' treatment the apex had cleared up, the crepitations were gone, and there were no T.B. in the sputum. Evening temperature normal. Weight increased from 7 st. 1¼ lb. to 8 st. 3 lb.

CASE 5.—Mr. J. H., aged 41. Consolidation right apex. T.B. present in sputum, crepitations, dullness on percussion. Weight 10 st. 9 lb. After six months' treatment the weight was 11 st. 6 lb. There were no T.B. in the sputum, no crepitations, and the percussion note was only slightly dull.

CASE 6.—Mr. J. M., aged 25. Took ill in India where he had calcium injections. When I first saw him he had consolidation of the right apex. Two months afterwards the left base became affected. Patient stated he felt better after the injections and continued with them a long time, but he lost ground and died almost two years after coming home.

CASE 7.—Mr. W. L., had been ill four months when he came to see me. Several of the family had died with tuberculosis. Three months after coming to see me he developed a cavity in the left apex. His illness ran a rapid course and he died in a few months. In this case the injections did not appear to have an appreciable effect on the disease.

The following cases were more advanced.

CASE 8.—Mr. J. M., aged 19. Had tuberculosis of the bladder; pus, blood, and T.B. in the urine. Frequent micturition and losing flesh. Weight 6 st. 12 lb. Three months later the patient had gained 7 lb. and felt much better. At the end of seven months the urine contained no pus, blood, or T.B. The urine was passed only three or four times a day. Weight 8 st. 3 lb.

CASE 9.—Mr. T. S., aged 32. Left apical cavity, tubercle of left vocal cord, T.B. in sputum. Three months after commencing treatment the lung dried up and the throat improved. The weight had risen from 9 st. 4½ lb. to 10 st. 3 lb. Eight months from commencement of treatment the throat was healed and there were no T.B. in the sputum. Patient avoided speaking as far as possible during that time.

CASE 10.—Mr. P., aged 36. Had been unfit for work for two years, mostly confined to the house. The expectoration was purulent and contained T.B. There was a cavity at the left base. After six months' treatment the sputum was free from T.B. and the temperature was normal.

CASE 11.—Boy, aged 14 years. Cavity left apex, T.B. in sputum. He did not react well to treatment. He stated, however, that he felt better after the injections, but unfortunately he lost ground and died after having been ill 14 months.

I consider that a review of these cases shows that we have in sodium morrhuate a valuable remedy for the treatment of tuberculosis, especially early cases.

AN INVESTIGATION INTO CRITERIA FOR ARTIFICIAL PNEUMOTHORAX

SERVICEABLE AS GUIDES TO TREATMENT.

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DURING the past two years there have been exceptional facilities at Frimley for observing cases of artificial pneumothorax. In this paper we have analysed certain outstanding clinical phenomena occurring in these cases during treatment, and endeavoured to correlate them with the immediate results obtained, in the hope that by this means we might acquire some information that would guide us in the treatment of our cases. We mean by "treatment" in this paper the general conduct of these cases at a sanatorium apart from the actual artificial pneumothorax treatment. Our conclusions have no bearing on the question of the value of artificial pneumothorax treatment, nor on the question of the proper amounts of air to be used in, or the correct spacing of, refills.

The cases have been of all types, and no selection whatever has been made. In the larger number, 60 out of 75, the pneumothorax was induced at Brompton Hospital. These are all Group 2 or Group 3 (L.C.C. classification) cases. The majority have been cases done for choice, presenting the probability of a good result, but some, especially those induced at the Sanatorium, have been "last resort" cases As this paper does not deal with "choice of case" or "suitability of treatment" or the results of artificial pneumothorax treatment *versus* any other form of treatment, these have all been classed together. The length of time between the induction of artificial pneumothorax and the commencement of exercise has been variable, and has, on the whole, been longer in those cases induced at Brompton Hospital than in those induced at the Sanatorium. The shortest time has been six days and the longest 285 days; the average time has been 106 days.

The cases are all drawn from the working classes, and, in laying down a course of treatment for them, it has to be borne in mind that, with very few exceptions, they have got to earn their own livings, the only alternative being the workhouse infirmary. Further, the length of time that can be devoted to treatment is limited to a certain extent by financial conditions. Although those who are under the care of the L.C.C. are given the most generous allowance of institutional treatment if there is the slightest chance of a favourable result yet there is a limit even to this. Other considerations such as the home finance, also have a great influence in L.C.C. cases, and more so when the patient or his family is bearing the cost of institutional treatment. This point has to be made clear, so that it may be obvious that in different circumstances the line of treatment adopted might be greatly modified.

DEFINITIONS.

For the proper reading of the following tables certain definitions are necessary.

Length of Treatment.—In all our calculations this has been taken from the time the patient started his first walking exercise up to the date of departure.

Classification.—The patients have been classified as to the immediate results of treatment as "much improved," "improved," "in statu quo," "worse," or "dead." As far as possible, this classification has been made absolute and not relative—that is to say, the initial condition of the patient has not been taken into account. Although a patient may have been saved from rapidly impending death by the induction of an artificial pneumothorax, unless he is discharged with practically no symptoms and fit to work he is not classified as "much improved."

"*Much Improved.*"—Practically free from symptoms. Apparently fit to work and earn a living. No pyrexia.

"*Improved.*"—Symptoms much ameliorated. Apparently fit to be up and about and to do light work. No pyrexia.

"*I.S.Q.*"—Symptoms still present. Apparently unfit to earn a living. Pyrexial or non-pyrexial.

"*Worse or Dead.*"—In this paper the I.S.Q., worse, and dead patients have been classified in one group labelled "worse."

Pyrexia.—A recorded mouth temperature during the day of over 99° F.

Relapse.—Any condition, whether accompanied by pyrexia or not, which has necessitated the patient stopping exercise and being put on "rest" for four days or more.

EXERCISE AND LABOUR.

Walking Exercise.—Grades of walking range from half to eight miles a day. To this must be added the exercise taken by the patient during his reaction hours—an amount that cannot be measured, and depending on the commonsense of the individual. In some cases this unmeasured exercise is excessive, and may be a great factor in controlling the apparent response to treatment.

Labour.—Work is done in two shifts of two hours each, but in some cases the second shift is only one and a half hours. It is divided roughly into five grades, but the actual work of each patient is considered separately, and two patients in the same grade may be doing very different amounts of work if measured in foot pounds. To this, again, has to be added exercise taken during recreation, with the same remarks as to its importance.

Grade 1: Carrying small baskets holding about 7 lb.

Grade 2: Carrying baskets holding about 14 lb. Light hoeing and weeding.

Grade 3: Carting, with three mates, using a light hand-cart. Hoeing and light digging with a small fork. Rolling, three men to a light roller.

Grade 4: Carting, with two mates, using same cart. Digging, using a medium fork. Cross-cut sawing. Mowing and rolling.

Grade 5: Digging and trenching, using full-size tools. Cross-cut sawing. Rolling and mowing.

The precision with which this form of treatment is carried out depends on the individual, but we hope that our numbers are sufficient to balance errors arising from personal inequalities in the performance of the work.

Nature and Incidence of Relapses in Relation to Immediate Results of Treatment.

As our definition shows, we have stretched the meaning of the word "relapse" to cover widely different conditions. It may mean, on the one hand, a definite set-back with exacerbation of the disease, or, on the other hand, a short cessation from exercise deemed necessary because of some slight, or even imaginary, clinical warning. The long relapses are of the first type, the shorter ones mainly of the second type. As might be expected, the probability of relapse varies inversely with the response to treatment, but our figures in Table I. show that the actual length of each relapse is of prognostic significance. This is found to be shortest in the "much-improved" class, and longest in the "worse" class, those in the "improved" class falling between the two. This fact is shown more clearly when viewed from a different standpoint, as is done in Table II. So that one can say that a long relapse denotes a bad prognosis. But, as will appear later, if that relapse is caused by the temporary disturbance of health coincident with the appearance of pleural fluid, although it may be of some length, it is not necessarily of bad prognostic significance.

The stage of exercise at which relapse occurs appears to be of extreme importance. Our findings are set forth in Table III., which shows that if a patient is able to reach a certain stage of walking exercise without relapse, he will probably be discharged as much improved; and even though relapses do occur in the much-improved class during the working period, it is obvious they must be very insignificant, and rest has been ordered more by way of a precautionary measure. If it is allowed, provided that other factors do not contradict it, that the best

prognosis in his own class is justified for a patient who goes through all grades of labour without relapse and is discharged "much improved," then it follows that this test of ability to do a certain grade of walking exercise without relapse must be a valuable guide to the physician in the early stages of treatment.

TABLE I.

Patients—		Patients who relapsed.	Relapses.	Av. length of each relapse.	Longest relapse.	Shortest relapse.
				Days.	Days.	Days.
"Much improved" ..	37	13	25	15	47	4
"Improved" and "slightly improved"	18	13	22	22·2	182*	5
"L.S.Q.," "worse" and "died"	21	17	28	40·1	122	6

* Next longest 47 days.

TABLE II.

Class.	Days from start of exercise to discharge.	Relapses.	Av. length of stay from start of exercise to discharge.	Time spent in relapses.
		Days.	Days.	Per cent.
Much improved	6410	375	173·3	5·85
Improved ..	3288	488	182·7	14·84
Worse	2145	1124	107·3	52·49

TABLE III.

Patients who Reached Three Miles Daily (Men) and Two Miles Daily (Women) Without Relapsing: 46 out of 73 = 63·0 per cent.

Of these, the number discharged as—
M.I. was 33 or 71·7 per cent.
I. „ 9 „ 19·6 „
W. „ 4 „ 8·7 „
—i.e., 33 out of 46 patients reaching three miles (men) or two miles (women) without relapsing were discharged as M.I.

The chances of such a patient being discharged as M.I. are practically 2·4 to 1 in favour; or the chances of such a patient being discharged as worse are practically 10 to 1 against.

Patients who Relapsed Before Reaching Three Miles Daily (Men) or Two Miles Daily (Women): 27 out of 73 = 37 per cent.

Of these, the number discharged as—
M.I. was 4 or 14·8 per cent.
I. „ 9 „ 33·3 „
W. „ 14 „ 51·9 „

The chances of such a patient being discharged as M.I. are practically 6 to 1 against; or the chances of such a patient being discharged as worse are practically equal odds.

65 per cent. of patients who are discharged as much improved do *not* relapse at all. Of the 35 per cent. who do relapse, 70 per cent. do not do so until they have passed three miles daily (men) or two miles daily (women).

27·7 per cent. of patients who are discharged as improved do *not* relapse at all. Of the 72·3 per cent. which do relapse, 69·2 per cent. do so before passing three miles daily (men) or two miles daily (women).

5·5 per cent. of patients who are discharged as worse do *not* relapse at all. Of the 94·5 per cent. which do relapse, 82 per cent. break down before passing three miles daily (men) or two miles daily (women).

Temperature Types of Different Groups.

In our study of temperatures we have investigated certain points, and, in order to make these clear, we submit the following definitions:—

Regularity.—A regular temperature is taken as one in which the morning and evening range only varies by a fraction of a degree over a considerable period of time. A periodic temperature is regular, provided the amplitude of the waves remains fairly constant, and provided the swing on the crests does not vary much from the swing in the troughs. A spiky temperature is irregular.

Swing.—The swing is the daily fluctuation which occurs in the temperature, as measured by the difference between the morning and evening records.

Periodicity.—A temperature is said to be periodic when the mean of the morning and evening temperatures rises and falls at constant intervals. Comparatively slight evidences of periodicity have been accepted.

Our study of temperature records in artificial pneumothorax cases does not disclose any startling facts. Table IV.A shows, as might be expected, that those patients who do well tend to have the more regular temperature, which presumably indicates that their resistance to the toxins of tuberculosis is stable, and not likely to be upset by slight alterations in their daily routine. The daily swing is apparently of no prognostic importance, according to the figures in Table IV.B. This is interesting, since a free swing in an ordinary case of pulmonary tuberculosis is usually regarded as a bad omen, and is certainly pathological. The menstrual periodicity in the temperature records of a high percentage of all tuberculous women is so marked that it obscures the significance of this feature, but the figures in Table IV.C show that a definite periodicity suggests a bad prognosis in men.

Extending our observations to the characters of the temperature record during relapses, Tables V. and VI. show that the combination of a sudden rise with fall by crisis is most frequent in the "much improved" class, and that in the "much improved" and "improved" classes 50 per cent. of the sudden rise temperatures come down by crisis; in the "worse" class only about 20 per cent. do so. The more abrupt the start and finish of the temperature relapse the shorter is it likely to be. This, coupled with our observation that the shorter the relapse the better the prognosis, agrees with Marcus Paterson's teaching that a smart temperature reaction to increased exercise in many cases does no harm to the patient. Such a short, sharp temperature relapse would seem to indicate a brisk and healthy response on the part of the patient to increased toxin absorption, and it is suggested that a more sluggish temperature response is to be regarded with suspicion and is not a true index of the degree of increase of the toxæmia.

TABLE IV.

A.—*Regularity.* B.—*Swing.*

Patients.	Regular.	Irregular	To 1°.	1°–1·6°.	Over 1·6°.
	%	%	%	%	%
M.I. (37)	26 (70·3)	11 (29·7)	12 (32·4)	20 (54·1)	5 (13·5)
I. (18) ..	9 (50)	9 (50)	4 (22·2)	11 (61·1)	3 (16·7)
W. (21) .	4 (19)	17 (81)	7 (33·3)	8 (38·1)	6 (28·6)

C.—*Periodicity.*

Patients.	Men +.	Men −.	Women +.	Women −.
	%	%	%	%
M.I.	1 (7·4)	18 (92·6)	14 (77·8)	4 (22·2)
I.	5 (41·7)	7 (58·3)	4 (66·7)	2 (33·3)
W.	5 (45·5)	6 (54·5)	8 (80·0)	2 (20·0)

TABLE V.

Patients.	Number of relapses.	Sudden rise.	Wave rise.	Resolution by— Crisis.	Lysis.
M.I.	20	12	8	6	14
I.	16	8	8	4	11
				(1 no resolution)	
W.	45	19	24	5	36
		(2 no rise)		(4 no resolution)	

TABLE VI.—*Length of Relapse in Days when Associated with—*

—	Sudden rise.	Wave rise.	Crisis.	Lysis.
M.I.	7·4	17·8	5·3	14·2
I.	6·9	10·9	6·3	9·9
W.	14·4	18·1	10·0	14·3

Degree of Completeness of Collapse.

Table VII. shows that those patients with a complete collapse tend to do better than those with only a partial collapse. But it is possible that this result may not be due to the actual completeness of the collapse, but to the fact that in those cases in which a complete collapse has been obtained the disease before induction may have been less extensive than in those in which the collapse was only partial. These figures, therefore, cannot be used as an argument for dividing adhesions in pneumothorax cases in order to produce complete collapse—a question which does not come within the scope of this paper.

TABLE VII.

—	Complete collapse.	Partial collapse.
M.I.	51·4 per cent.	48·6 per cent.
I.	16·7 ,,	83·3 ,,
W.	14·3 ,,	85·7 ,,

Prognostic Importance of the Condition of the other Lung.

The question as to the extent and type of disease in the other lung in the presence of which it is permissible to induce an artificial pneumothorax is a very interesting one, but again does not come within our scope here. Our figures, however, in Table VIII. show that while bilateral disease is compatible with a good result in a large number of cases (37·9 per cent. of the "much improved" group had bilateral disease), yet its presence is against a good prognosis, as is shown by looking at the figures in a different way (Table VIII.A).

TABLE VIII.

Patients.	Disease in other lung.	No disease in other lung.
	Per cent.	Per cent.
M.I.	37·9	62·1
I.	44·4	55·6
W.	85·7	14·3

TABLE VIII.A.*

Bilateral.	Unilateral.
%	%
14 (35)	23 (63·8)
8 (20)	10 (27·7)
18 (45)	3 (8·3)

* Of the 76 patients 40 had bilateral disease and 36 unilateral disease.

The Influence of Pleural Effusion.

The development of fluid in a pneumothorax cavity is generally held to have an adverse influence in the progress of the case. Our figures, however, do not bear this out. The idea of the evil effects of fluid has probably arisen from the fact that all types of fluid have been classed together without due regard to their nature and cause. We have very little actual knowledge as to their cause, but they can be classified according to their nature and behaviour. We find:—

1. Clear effusions, with small cell content, showing a high percentage of lymphocytes. These effusions, though persistent, do not tend to increase in amount; they are apparently more of the nature of transudates into an unnatural body cavity than actual inflammatory exudates. Their appearance is usually unaccompanied by constitutional disturbance.

2. Clear effusions, containing enough fibrin to clot, with a heavy cell content, showing a high percentage of lymphocytes and usually the presence of tubercle bacilli. They tend to increase in amount and to recur after removal, and must be regarded as definite inflammatory exudates from an invaded pleura. They probably occur after the pleura itself, previously free, has been invaded by the tuberculous process. Their onset is usually accompanied by constitutional disturbance which is often severe.

3. Cloudy or definitely purulent effusions with a heavy cell content, showing lymphocytes and polymorphonuclear leucocytes in varying proportions, with usually a preponderance of the latter. Tubercle bacilli are usually present, but the exudate is otherwise sterile. They tend to increase in amount and to recur after removal. They are sometimes purulent from the start, or No. 2 type may change into No. 3. Their onset is that of type No. 2. They tend to "point" sooner or later.

One cannot doubt that type No. 1 may be an innocuous phenomenon while type No. 3 may be very much the reverse, and therefore before the influence of pleural fluid in the progress of the case can be judged, the type of the fluid must be ascertained. Unfortunately in this present series of observations we have not recorded the different types of fluid, but the results show, we think, that the greater proportion must be of types No. 1 and No. 2.

Table IX. shows that the development of fluid has no deleterious influence on the immediate result; about the same percentage develop fluid in each class.

It has been said that exercise predisposes the patient to the development of fluid, but our figures in Table X. do not agree with this. The numbers do not correspond with those in Table IX., for in Table X. we have not included those cases in which fluid was present from the start of the artificial pneumothorax, as in gas replacements of pleural effusions, and spontaneous hydropneumothoraces subsequently converted into artificial ones. The development of fluid therefore is not determined by exercise, but more probably by the degree of involvement of the pleura by active tuberculosis, either present at the outset or occurring subsequently.

Tables XI. and XII. show that the presence of pleural fluid has no influence on the capacity for work or the likelihood of relapse. The length of time spent in relapse and the chance of relapse is equal for those with and without fluid. The figures in Table XI. do not refer to the total number of cases in each class, but only to those who relapsed in each class. We think that these figures are encouraging, as they show that, at any rate, non-purulent effusion, although a common complication of artificial pneumothorax, is not a serious one.

TABLE IX.

M.I.	Improved and slightly improved.	I.S.Q., worse, and dead.
With fluid .. 14 (37·8%)	7 (38·8%)	9 (42·8%)
Without fluid 23 (62·2%)	11 (61·2%)	12 (57·2%)

TABLE X.

—	Patients developing fluid— Before exercise.	Patients developing fluid— Subsequent to commencement of exercise.
M.I. .	6	6
I. ..	2	2
W. ..	3	2

TABLE XI.

Percentage of time from exercise to discharge spent per patient in relapses— With pleural fluid.	Without pleural fluid.
15·37	11·88
15·38	20·26
56·36	53·42

TABLE XII.—*Stage of Exercise, at Departure, of Patients With and Without Pleural Fluid.*

—	No exercise.	½ to 1 mile.	1½ to 3 miles.	4 miles and grades 1 and 2.	Grades 3, 4, and 5.
With Pleural Fluid.					
M.I. ..	1	—	—	—	13
I.	1	—	1	1	4
W. ..	7	1	—	1	—
Without Pleural Fluid.					
M.I. ..	—	—	—	1	22
I.	—	2	3	1	5
W. ..	7	2	—	1	—

Disappearance of Tubercle Bacilli from the Sputum.

Table XIII. shows that the disappearance of tubercle bacilli from the sputum as a result of the induction of an artificial pneumothorax is of the highest

importance in prognosis. These figures speak for themselves and require no elaboration; and it seems that the disappearance of bacilli will occur even though there be disease in the opposite lung, and in cases where only a partial collapse has been obtained. For of the 35 "much improved" cases who lost their bacilli 15 had bilateral disease and 17 had a partial collapse; of the 9 "improved" cases 3 had bilateral disease and 6 a partial collapse; of the 5 of the "worse" class 1 had bilateral disease and 4 a partial collapse.

TABLE XIII.

Total number of cases whose records with regard to presence or absence of tubercle bacilli in sputum are known	75	
Number of patients whose sputum became negative after A.P.	49	(65·3 per cent.)
Of these, discharged as much improved	35	(71·4 ,, ,,)
,, ,, ,, ,, improved	9	(18·4 ,, ,,)
,, ,, ,, ,, worse	5	(10·2 ,, ,,)
Number of patients whose sputum remained positive after A.P.	26	(34·7 per cent.)
Of these, discharged as much improved	2	(7·7 ,, ,,)
,, ,, ,, ,, improved	8	(30·8 ,, ,,)
,, ,, ,, ,, worse	16	(61·5 ,, ,,)

Importance of Changes in the Weight of the Patient.

Table XIV. shows that a steady gain in weight is valuable evidence of the satisfactory response of the patient to treatment. It is important to notice that this table does not refer to the changes in weight occurring from the time of induction of the pneumothorax but from the commencement of sanatorium treatment, which was generally three to four months later.

TABLE XIV.

—	Gain in weight.	Steady.	Loss.
	Per cent.	Per cent.	Per cent.
M.I.	73·0	24·3	2·7
I.	35·3	29·4	35·3
W.	13·3	26·7	60·0

TABLE XV.

	Av. length of stay in days from exercise to discharge.
M.I.—Gained weight, 27	183·7
Remained steady, 9	149·9
Lost weight, 1	118·0
I.—Gained weight, 6	229·3
Remained steady, 5	190·0
Lost weight, 6	139·7
W.—Gained weight, 2	180·0
Remained steady, 4	65·0
Lost weight, 9	122·0

Those in bed, or for other reasons not weighed, excluded.

TABLE XVI.

	Av. gain in weight.
M.I.—Patients with fluid, 14	14·6 lb.
Patients without fluid, 23	4·4 ,,
	Av. loss in weight.
I.—Patients with fluid, 6	0·4 lb.
Patients without fluid, 11	1·6 ,,

(1 improved patient with fluid was not weighed.)

	Av. loss in weight.
W.—Patients with fluid, 7	2·6 lb.
Patients without fluid, 8	7·2 ,,

(2 worse patients with fluid and 4 without were not weighed.)

TABLE XVII.

	Av. length of stay in days from exercise to discharge.
M.I.—Patients with fluid, 14	194
Patients without fluid, 23	160
I.—Patients with fluid, 6	225
Patients without fluid, 11	165
W.—Patients with fluid, 7	125
Patients without fluid, 8	105

We also found that those patients who relapsed or had pleural fluid gained weight or lost according to the class that they were in, uninfluenced by the relapse or the fluid. The explanation of this somewhat surprising fact appears to be, as is shown in Tables XV., XVI., and XVII., that gain of weight was more probable in those who had the longer stay in the sanatorium, which was the case with those who relapsed and those who had pleural fluid.

A careful inspection of these tables will reveal a definite correlation between the length of stay and the increase in weight. Only one exception occurs—namely, that with the patients of the "worse" class who lost weight; the probable explanation in this case is that they had entered upon a pyrexial relapse which prevented their being discharged, and at the conclusion of which they were removed to an infirmary as being unlikely to derive benefit from sanatorium treatment. Apart from this one class, however, the correlation is valid. Remembering the limited number of cases which are being dealt with, one cannot expect to find an exact quantitative correlation between the length of stay and the increase in weight, but the fact that the variation uniformly occurs in the same direction serves to show that the relationship is not a fictitious one.

Conclusions.

1. If a relapse occurs during the exercise treatment of an artificial pneumothorax case, there are two salient points of interest: (*a*) the longer it is, the worse is the prognosis; (*b*) the earlier it occurs the less likely is the patient to do well. A relapse which takes place for the first time when the patient has reached an advance grade of exercise seems to be of singularly little importance. We may say that if a patient is going to do badly, he will relapse early; if he is going to do well, he will relapse late or not at all.

2. A regular temperature is of good prognostic significance; an irregular one is the reverse. In men a periodic temperature is an unfavourable feature. The daily variation seems to have no special significance.

3. We find that the patients who have done well have more often had a complete collapse than those who have done badly. In the absence of any quantitative estimation of the degree of completeness of the collapse, and in view of the fact that the extent of disease has varied considerably in our patients, we refrain from drawing any conclusions as to the meaning of this observation.

4. It is clear that a considerable number of patients with bilateral disease are capable of responding well to artificial pneumothorax treatment, and of reacting favourably to the system of graduated exercise which is given to them preparatory to their ingress once more into the world of activity.

5. It is probably fair to say that the development of pleural fluid—so long as it be not of a purulent type—is a matter of supreme indifference to the prognosis of the case. It is interesting, too, to note we have no evidence which suggests that the advent of fluid is likely to be occasioned by exercise.

6. Persistence of tubercle bacilli in the sputum after the induction of artificial pneumothorax is a feature of bad omen. Our figures show that if the sputum remains positive the chances are 19 to 1 against the patient being discharged as much improved.

7. One of the most valuable criteria of the patient's reaction to treatment is the change in weight which occurs after his admission to the sanatorium. Though it is not uncommon for patients, even in the worse class, to gain a little in weight, it is very uncommon for those who are going to do well to lose any. How true this is can be seen from our tables, which show that if a patient loses weight progressively after starting exercise the chances are 37 to 1 against his being discharged as much improved. An early loss in weight should prove a most valuable arresting signal, and should lead to a careful reconsideration of the further treatment of the patient.

8. The longer the patient's stay in the sanatorium the more weight is he likely to gain or the less is he

likely to lose. Though not desiring to extol sanatorium treatment, above other methods, we consider that this fact reflects very favourably on this form of treatment.

In this paper we have been concerned with an examination of the results obtained by the graduated exercise treatment of patients on whom an artificial pneumothorax has been induced either by choice or by necessity. We do not wish to advocate this method, as, from the nature of the cases, it has been more or less forced on us, but we would point out that under it no fewer than 49 per cent. of an unselected, consecutive series of cases have been discharged as much improved and capable of earning their living in the world. With the indications which we have gathered from this examination, with the danger signals more clearly pointed out than heretofore, and with the elucidation of certain promising features to give us confidence in the pursuit of treatment, we feel that it should not be impossible in the future to secure results which will be even more hopeful than those obtained in our present series.

ARTIFICIAL PNEUMOTHORAX.

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IN 1922 Dr. A. S. MacNalty and I issued a report[1] to the Medical Research Council on artificial pneumothorax. The present paper is a second report to the Council on the same subject, and I propose to give the results up to date of my first 250 cases and to consider the dangers and complications which may arise during the treatment. In conclusion, I shall discuss the value and limitation of artificial pneumothorax in the treatment of pulmonary disease.

Results of Treatment.

In order to analyse the results of treatment I divided my cases into the following groups:—

A. Patients with little or no powers of resistance, and a rapidly spreading acute infection.

B. Patients with good powers of resistance and in the early stage of the disease.

C. Patients with medium resistance who have failed to improve after other treatment. This group is subdivided into:—

(1) Involvement of one lung only; (2) some involvement of the better lung; and (3) involvement of a third or more of the better lung.

D. Non-tuberculous cases.

Tubercle bacilli were found in the sputum in all cases except those in Group D.

The following tables give an analysis of my first series (150 cases) arranged according to the above groups, and show the result of treatment in May, 1922, when the previous report was written, and the condition of the same patients in January, 1924. By arrested is meant disappearance of tubercle bacilli from the sputum for at least six months, no apparent active disease, and ability to do full work.

From the 107 cases in Table I. it will be seen that the results in Group C 1 are good and are remaining good, especially when one remembers that in each of these cases artificial pneumothorax was induced only because the patient was not making good progress under other treatment. When we turn to Groups C 2 and C 3 the results are not good. This one would expect, because the pneumothorax rests only one lung, and it is therefore only part of the diseased area that is having treatment in cases of bilateral disease.

[1] L. S. T. Burrell and A. Salusbury MacNalty: Report on Artificial Pneumothorax, Medical Research Council, Special Report Series 67. London. 1922.

TABLE I.—*Cases in which an Efficient Pneumothorax was Produced.*

Group—	A.	B.	C 1.	C 2.	C 3.	D.	Total.
Arrested—							
1922 ..	—	2	27	4	—	7	40
1924 ..	—	2	30	4	—	8	44
Better—							
1922 ..	—	—	13	6	1	2	22
1924 ..	—	—	6	4	1	2	13
No change—							
1922 ..	—	—	1	6	2	3	12
1924 ..	—	—	—	2	—	1	3
Worse—							
1922 ..	—	—	—	7	6	—	13
1924 ..	—	—	4	2	—	—	6
Dead—							
1922 ..	3	—	2	3	9	3	20
1924 ..	3	—	3	14	17	4	41
Total ..	3	2	43	26	18	15	107

TABLE II.—*Cases in which only a Partial and Incomplete Collapse was Produced.*

Group—	A.	B.	C 1.	C 2.	C 3.	D.	Total.
Arrested—							
1922 ..	—	—	—	—	—	—	0
1924 ..	—	—	1	—	—	—	1
Better—							
1922 ..	—	—	2	1	—	—	3
1924 ..	—	—	1	—	—	—	1
No change—							
1922 ..	—	—	2	1	—	—	3
1924 ..	—	—	—	1	—	—	1
Worse—							
1922 ..	—	—	—	1	—	—	1
1924 ..	—	—	2	—	—	—	2
Dead—							
1922 ..	2	—	1	2	7	1	13
1924 ..	2	—	1	4	7	1	15
Total ..	2	0	5	5	7	1	20

TABLE III.—*Cases where Pneumothorax could not be Produced owing to Adherent Pleura.*

Group—	A.	B.	C 1.	C 2.	C 3.	D.	Total.
Arrested—							
1922 ..	—	—	—	—	—	—	0
1924 ..	—	—	—	—	—	—	0
Better—							
1922 ..	—	—	2	—	—	—	2
1924 ..	—	—	1	—	—	—	1
No change—							
1922 ..	—	—	4	2	—	—	6
1924 ..	—	—	2	—	—	—	2
Worse—							
1922 ..	—	—	1	5	—	1	7
1924 ..	—	—	—	2	—	—	2
Dead—							
1922 ..	2	—	1	—	4	1	8
1924 ..	2	—	5	5	4	2	18
Total ..	2	0	8	7	4	2	23

The following tables give the result of my first 250 cases (which, of course, include the 150 already given). I do not think it necessary to have a special subdivision for Group B, so in these tables Group C 1 includes those formerly in B. There were only two cases. I have also separated those cases which started as spontaneous pneumothoraces.

TABLE IV.—*Cases in which an Efficient Pneumothorax was Produced.*

—	S.P.	A.	C 1.	C 2.	C 3.	D.	Total.
Arrested ..	2	—	50	17	—	13	82
Better ..	—	1	8	13	1	2	25
No change ..	1	—	3	6	—	4	14
Worse ..	2	—	6	7	1	—	16
Dead	3	3	4	18	19	6	53
Total ..	8	4	71	61	21	25	190

S.P. = Spontaneous pneumothorax.

TABLE V.—*Cases in which only a Partial and Incomplete Collapse was Produced.*

—	A.	C 1.	C 2.	C 3.	D.	Total.
Arrested	—	2	—	—	1	3
Better	—	1	2	—	—	3
No change	—	—	1	—	—	1
Worse	—	2	1	—	—	3
Dead	3	1	5	11	1	21
Total	3	6	9	11	2	31

TABLE VI.—*Cases where Pneumothorax could not be Produced owing to Adherent Pleura.*

—	A.	C 1.	C 2.	C 3.	D.	Total.
Arrested	—	—	—	—	—	0
Better	—	2	—	—	—	2
No change	—	3	2	—	—	5
Worse	—	1	2	—	—	3
Dead	2	5	6	4	2	19
Total	2	11	10	4	2	29

As one would expect, the more extensive the disease the less chance there is of producing an efficient pneumothorax, and it will be seen that I failed to produce an efficient one in 17 cases (19·3 per cent.) out of the 88 in Group C 1; in 19 (23·7 per cent.) out of the 80 in C 2; and in 15 (41·6 per cent.) out of the 36 in C 3. If Table VI. is compared with Table III. it will also be seen that there were far fewer failures in the last series. Of the first 150 cases I failed to produce any pneumothorax at all in 23. Of the next 100 cases I failed in 6, and since then I have treated 94 more cases with 7 failures. At present, therefore, the percentage of complete failures is 6·6.

The figures in Table IV. are very similar to those in Table I., and show good results in Group C 1, but very bad in C 3, and poor in C 2. This supports the opinion formed after consideration of the first 150 cases, that for the most part it is only in unilateral cases that really good results are obtained by artificial pneumothorax. In many of the bilateral cases the immediate results are excellent, and in some cases dramatic, but after a time they usually relapse so that the late results are not good. The following two cases illustrate the good results obtained at first in bad cases; results which must be attributed to the treatment, for the improvement followed so immediately after its beginning.

CASE 1.—A woman, aged 38, developed tuberculosis of the left lung in 1916 and went to a sanatorium for nine months. She improved and kept fairly well until 1919, when she began to lose ground, and in February, 1920, she took to bed with an evening temperature of 101°–102°F. She steadily grew worse, and in August she was much wasted, was still running the same temperature, and had copious expectoration. There were signs of disease all over the left lung, and moist râles were heard at the right apex, both in front and behind. X rays showed disease all over the left lung and considerable infiltration of the upper and middle zones on the right side. Left artificial pneumothorax was induced, and the temperature at once fell to normal, the cough improved, and the sputum lessened. In September she got up, and later was able to take short walks. In January, 1921, however, the high temperature returned, and the treatment was stopped owing to spread of disease on the right side. She gradually became worse and died in June, 1921.

CASE 2.—A woman of 36 contracted tuberculosis of the left lung in 1919, and after treatment at home went to a sanatorium for three months in 1920, and then had a voyage to Australia for three months. On her return she was much wasted, and had a severe cough with sputum loaded with tubercle bacilli. There were moist râles all over the left lung, and on the right side moist sounds were heard in front to the third rib in the nipple line, and behind to the spine of the scapula. X rays showed much disease in both lungs. Her weight, which normally was 130 lb., was then only 109 lb.; she looked toxic and had a swinging temperature. In August, 1921, I induced a left pneumothorax and gave small frequent refills. She gradually improved, tubercle bacilli became fewer and fewer, and eventually disappeared from the sputum. For a time the right (untreated) lung appeared to improve, and her weight went up to 121 lb. In February, 1923, however, she had a febrile attack and rapidly became worse. There was an increase of signs on the right side, and the refills were stopped. Now (January, 1924) her weight is 109 lb., she is afebrile whilst in bed, but has an evening temperature if allowed up. The left lung is re-expanded and fibrotic, but the disease has spread over the right side. The question of inducing a right pneumothorax is being considered, and she herself is anxious for it to be done as she felt so much benefit from the first pneumothorax.

Complications and Dangers.

Effusion.—The development of pleural effusion is a frequent and important complication of artificial pneumothorax treatment. Forty of my first 150 and 26 of my next 100 cases developed it. Of the last 94 cases 19 have already developed effusion, and more are certain to develop it later, as in many cases the treatment has only recently been started. It would seem, therefore, that increased experience does not affect the incidence of this complication. I have not found that such means as warming the gas or using some gas other than air have any effect in preventing the formation of these effusions.

TABLE VII.—*Showing the Time After Starting the Treatment when the Effusion Appeared in My First 250 Cases.*

Month—	A.	C 1.	C 2.	C 3.	D.	Total.
1st	2	1	2	4	1	10
2nd and 3rd ..	—	4	9	3	—	16
4th to 6th ..	1	8	9	1	—	19
7th to 12th ..	—	8	8	—	—	16
13th to 18th ..	—	3	1	—	—	4
19th to 24th ..	—	—	1	—	—	1
Total	3	24	30	8	1	66

Thus 24 (33·8 per cent.) of the 71 cases in Group C 1, 30 (49·1 per cent.) of the 61 in C 2, and 8 (36·1 per cent.) of the 21 in C 3 developed pleural effusion. The smaller percentage in Group C 3 does not indicate that advanced cases are less liable to develop effusion than others, for many of these cases either died soon after the treatment started or the treatment was stopped early owing to the advanced disease. Of the 14 cases in Group C 3 in which the treatment was kept up for more than 6 months 8 (57·1 per cent.) developed effusion.

TABLE VIII.—*Showing the Result of Treatment in Groups C 1 and C 2 in My First 250 Cases in those with and without Effusion.*

—	With effusion.		Without effusion.	
	C 1.	C 2.	C 1.	C 2.
Arrested	19	5	31	12
Better	1	8	7	5
No change	—	4	3	2
Worse	2	2	4	3
Dead	2	11	2	7
Total	24	30	47	31

It would seem, therefore, that in Group C 1 cases with effusion do as well as those without. In Group C 2, however, those patients who developed effusion did less well than the others. In 14 cases the effusion turned into tuberculous pus. Of these 7 were in Group C 1, 4 being arrested, 1 better, and 2 worse. Excluding those cases in which artificial pneumothorax was induced to replace effusion, I have treated 20 non-tuberculous cases by pneumothorax, and except in one case of an acute abscess, where X rays showed a small pool of fluid not sufficient to fill in the costo-diaphragmatic angle and which was absorbed in a few days, not one of these non-tuberculous cases developed effusion. Moreover, the cytology in all cases when fluid was removed showed a big lymphocytosis, and no organism except the tubercle

bacillus was found in any case. Tubercle bacilli were not found as a rule in the early stages of the effusion, but they invariably appeared in effusions of long standing. Tuberculous pleurisy is a common complication of pulmonary tuberculosis, and if the visceral and parietal pleura are separated by a pneumothorax so that any exudate cannot produce adherent pleura one would expect the pleura to weep and cause an effusion. For these reasons I am inclined to believe that these effusions are tuberculous exudates, and are common in cases of pneumothorax because the visceral and parietal pleuræ are not in contact.

Pleural shock or *gas embolism* may occur during the production of a pneumothorax or during a refill. Fortunately, these accidents are very rare. Out of 344 cases (and if one includes cases in which a bilateral pneumothorax was induced and cases where the first attempt to produce a pneumothorax failed and other attempts were made, 467 punctures of the pleura with the purpose of inducing a pneumothorax) I have had one case of fatal pleural shock, and this was at the second attempt. In one case the patient became faint and almost pulseless for a few minutes, and in three others the patients complained of a temporary feeling of faintness. Out of 5157 refills 9 complained of a temporary faintness, and one became faint and nearly pulseless for a few minutes during a refill. In one case the symptoms were more alarming: during the third refill the patient felt giddy, after the fourth refill she had a sudden pain over the heart and could not breathe and lost consciousness for about two minutes. During the fifth refill she suddenly gave a gasp, became blue and almost pulseless, and afterwards said she felt as if about to die. She did not actually lose consciousness and was all right half an hour later. The treatment was discontinued. In one other case during the third year of treatment the patient became giddy a few minutes after a refill and felt pins and needles down one side and lost her sight for about ten minutes, but did not lose consciousness. This last case, I think, was one of gas embolism, but I feel sure that all cases are not due to embolism and that pleural shock exists. Often on giving a local anæsthetic when there can be no question of embolism the patient complains of a sickly feeling as soon as the small hypodermic needle touches the pleura. Moreover, symptoms of shock are apt to recur in the same patient, apparently because the pleura is hypersensitive. This would not be the case if the symptoms were due to gas embolism.

In two of my cases a spontaneous pneumothorax occurred on the better side and led to a fatal issue. In six cases there was a *rupture of the visceral pleura* on the treated side leading to pyopneumothorax. Two of these cases were in non-tuberculous patients and both recovered. The others were cases of pulmonary tuberculosis, three proved fatal and the other is dying. It often happens that a small amount of *surgical emphysema* occurs, but in only one of my cases was it serious. In this case two attempts were made to induce an artificial pneumothorax, but they failed owing to adherent pleura. 24 hours later the patient complained of pain across the chest, and some surgical emphysema was found in the chest and neck. Two days later it had spread all over the chest and abdomen. Both arms and hands were affected, and the neck, face, and scalp were much swollen with the emphysema, and he could hardly see out of his eyes. There was no emphysema below Poupart's ligament. There was no pyrexia, and no pain or symptoms except a slight choking feeling. After three days the emphysema began to subside, and it had completely disappeared in a week.

Value and Limitations of the Treatment.

From a study of these cases it seems to me that artificial pneumothorax is a safe and satisfactory method of resting a diseased lung. As it is impossible to rest both lungs at once one would expect the results to be much better in unilateral than in bilateral cases, and this is found to be the case. Indeed, a highly active and extensive lesion in one lung readily yields to pneumothorax treatment, and the case does better than one with smaller and less active lesions in both lungs. The great difference between the results in unilateral and bilateral disease is, I think, strong evidence that the pneumothorax is the important factor in checking the disease. But bilateral disease is not necessarily a contra-indication. When the lung with most disease is collapsed the other lung usually improves at first, just as in other tuberculous lesions when the main focus is removed. For instance, ulceration of the bladder may heal after removal of a tuberculous kidney. After a time, however, disease frequently spreads in the untreated lung, and although on allowing re-expansion of the diseased lung there is usually improvement on both sides, and the case may be converted into a chronic fibroid type lasting several years, the ultimate prognosis is not good. If activity persists in the untreated lung after re-expansion of the other it is sometimes possible to induce a pneumothorax on that side. This often gives very good immediate results, but here again the ultimate results are disappointing. Even in very advanced cases life may be considerably prolonged by artificial pneumothorax.

It is sometimes said that these unilateral cases which do so well with pneumothorax treatment are just the type which do well on any treatment; but these pneumothorax patients had had other treatment, and pneumothorax was induced only because they were not doing well under it. It is true that a patient under hospital or sanatorium treatment may improve after doing badly at first, but the number of successful results in pneumothorax cases *who were doing badly under other treatment* is worthy of note.

Indications for Artificial Pneumothorax.

The question arises, When should an artificial pneumothorax be advised? Clearly it is wrong to wait until all other treatment has failed and the patient is in an advanced stage of disease. On the other hand, if the patient is treated properly and at once, pneumothorax treatment does not, as a rule, become necessary.

There are two factors which affect the treatment of the earlier cases. In the first place, the importance of rest during active disease is not appreciated; patients who ought to be in bed are walking about and even playing games. Bed is considered weakening. Fresh air and good feeding are, I agree, very necessary, but far more important is rest. In the second place, the gravity of the disease in the early stages is often underrated. A certain number of cases do undoubtedly recover without any treatment whatever, but many do not. In England and Wales in 1922 over 55,000 people were notified as having pulmonary tuberculosis, and over 42,000 died of it. Treatment is satisfactory only in early cases, and it is therefore these cases that most urgently require treatment, which should be kept up until the disease is arrested. It should not be stopped when the patient is better but not well.

As I have said, if the case comes under observation early artificial pneumothorax is not usually required, because a period of rest followed by sanatorium treatment is generally sufficient to effect arrest. But if in spite of rest the patient fails to improve or becomes worse, then I should advise rest of the diseased lung by means of artificial pneumothorax, in addition to the other treatment. In favour of this I would urge: (1) It is a safe method of treatment; (2) unilateral cases do very well, even those which were getting worse under other treatment; (3) the earlier the pneumothorax is induced the less chance there is of finding adhesions which may prevent a satisfactory collapse; (4) every case of advanced disease has passed through an early stage. Whilst encouraging the patient and taking an optimistic view the physician should remember that the great object of treatment is to prevent the

disease from getting into the incurable stage. A patient is often too bad for treatment but never not bad enough.

In bilateral cases, if there is not much activity in the better lung, satisfactory results may be obtained, but the better lung should be carefully watched, and if the disease spreads in it pneumothorax treatment should be stopped. In non-tuberculous cases very good results are obtained in cases of abscess of lung, repeated hæmoptysis, and recurrent pleural effusion. In cases of bronchiectasis there is often improvement, but the results are not so good as there is usually a considerable amount of adherent pleura, and also in most cases the disease is bilateral.

Artificial pneumothorax should be regarded not as a cure for tuberculosis of lung, but as a safe method of resting the diseased part, and it should be used in conjunction with other methods of treatment.

Finally, I would say that the success of the treatment is largely dependent on really keeping the lung at rest, taking each case individually and arranging the dosage and intervals between the refills according to the peculiarities of the individual patient.

A CASE OF GAUCHER'S ANÆMIA.

BY NORAH H. SCHUSTER, M.B., CH.B. MANCH.,
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Gaucher's anæmia has been studied in all European countries and America, so that its incidence is evidently widespread, and probably not so rare as heretofore imagined. Reuben, in 1914, analysed 14 cases of children dating from Gaucher's original paper in 1886; since then 10 have been definitely claimed, mostly in the States, and three or four unproven diagnoses have also been made. The following case is considered as belonging to the same group, though it shows some variation from the characteristic story.

The disease occurred in a girl of 1 year 10 months who was perfectly well until a fortnight before admission to hospital. She then suddenly seemed to lose colour, became apathetic and lost weight. She vomited twice and was rather constipated. There was no history of hæmorrhage from any source. She was the first and only child of young healthy parents, and though always under weight had shown normal muscular, bone, and mental development.

Condition on Admission.—On examination she was noticed to be of a golden-yellow hue with pale mucous membranes and a fair quantity of subcutaneous fat. Her weight was 18 lb. 7 oz. There was no conjunctival thickening. The condition of the mouth was healthy except that the tonsils were enlarged. The chest showed no abnormality. Small glands were palpable in the axilla. The abdomen was distended by flatulence. There was a large, hard, tender spleen reaching to the level of umbilicus. The nervous system was normal. The urine contained acetone and a few red cells, but showed no other abnormality. The fæces contained no occult blood. The Wassermann reaction was negative and the fragility of the red cells was not increased. The blood report was as follows: red cells, 1,070,000 per c.mm.; white cells, 14,400 per c.mm.; Hb, 28 per cent.; colour index, 1·4. Differential count: Polymorphonuclears, 56 per cent.; lymphocytes, 39 per cent.; transitional, 4 per cent.; mast cells, 1 per cent. The red cells were variable in size with many myelocytes but regular in shape. Polychromatophilia was common, but no punctate basophilia was observed. One nucleated red cell was noted in the film. In several films examined only one myelocyte of an adult type was found. The temperature and pulse and respiration were all irregular, the temperature rising to 101° F. each day, and the pulse varying between 120 and 170 per minute. The patient remained one week in hospital, during which time she failed to respond to treatment with arsenic, but did not show any rapid change for the worse until the seventh day, when she died suddenly with acute œdema of the lungs. A few days before this, four or five minute petechiæ, which quickly became brown and faded, appeared in the skin over the abdomen.

Post-mortem Examination.—The adenoid pad and tonsils were slightly enlarged and one tonsil contained two small purulent foci. The lungs showed considerable œdema, but no pneumonia or hæmorrhages. The heart muscle presented obvious fatty degeneration but no other lesion. In the abdomen there was gaseous distension of the stomach and intestines. There was no lymphoid hyperplasia. The liver was slightly enlarged and showed no naked-eye changes. Free iron was just demonstrable. The spleen was attached by recent adhesions to the stomach and posterior wall of the abdomen. It was much enlarged and weighed 8 oz. The organ was firm and the notches prominent. On section the pulp was firmer than normal and bright red in colour. The Malpighian bodies were not enlarged. A large and a small white infarct were present. Free iron could be demonstrated. The kidneys were very pale, but otherwise normal to the naked eye. The thymus was not enlarged. The endocrine glands showed no change. The cervical lymph glands were all enlarged, pale, and firm and were quite discrete. The mediastinal and mesenteric glands were normal in size, but there was enlargement of those near the spleen and in the retro-peritoneal tissue. The bone-marrow was pink in colour, but did not appear to be hyperplastic. Cultures were taken from the splenic pulp and found to be sterile.

Microscopical Examination.—The low-power view of sections of the spleen presented a series of rounded spaces which were well defined by fibrous tissue, and partially filled with Gaucher cells. There were so many of these half-empty spaces that the spleen was almost lobulated in appearance. It could not actually be demonstrated that these were venous spaces, though it was probable, and they had the same appearance as those which Mandelbaum describes as such in his specimens. No endothelial lining was visible. The cells, which were of the Gaucher type, were large and oval and rounded, sometimes with a nucleus to one side and semilunar in shape, and sometimes with the nucleus round and more or less in the centre. The cytoplasm did not stain clearly and was often foamy; many cells also had definitely clear vacuoles, but none stained as fat with Sudan III., and there were no doubly refracting crystals in any part of the tissue. Some of the cells contained a well-formed red corpuscle and others contained dark granules. These cells were not limited to the enclosed spaces but occurred throughout the organ. There were in addition multinucleated cells like myeloplasts and an occasional eosinophil granular cell with a small round deeply staining nucleus. The Malpighian bodies were diminished in size and showed no changes in the germ centres. There was slight general increase of fibrous tissue and a few areas of hæmorrhage. The infarcted portion was of the same nature in a condition of coagulation necrosis. No abnormal cells could be found either in the liver or kidneys, and there was no fatty change in either. Some of the liver cells were foamy, but no doubly refracting material could be demonstrated. The cervical and some of the abdominal lymph glands presented similar changes to those in the spleen—i.e., there was an invasion of the follicles by large mononuclear cells with poorly staining and vacuolated protoplasm. They had no special arrangement and did not appear in the vessels. No multinuclear cells were present.

These histological findings correspond to those reported in other cases, though some observers deny phagocytosis, and here we find ingestion of red corpuscles; and in no other instance has necrosis been recorded. As in all the other specimens, except one of Mandelbaum's, the lymphoid tissue is diminished. The clinical interest of the case lies in the youthful age of the patient and in its rapid course. The onset was acute and the child lived only three weeks, having been remarkably well just before. Most cases of this disease are very chronic in course, and when it occurs in children it usually leads to progressive anæmia and emaciation and not to sudden death as in this case while the nutrition was still good. The blood picture is characteristic and differentiates from von Jaksch anæmia with its myelocytes. It differs by showing a slight leucocytosis instead of the usual leucopenia, but as there are no other signs of lymphatic proliferation it is possible that it was a terminal event, and that earlier counts might have been lower. The only other peculiarities are a liver that is not enlarged and the absence of gross hæmorrhages. Nearly all previous cases have suffered from epistaxis; in this patient there was no bleeding, but the petechiæ on the abdomen seem to have been authentic and were confirmed by several observers.

In spite of these variations from some of the cardinal signs and symptoms, the histology of the spleen, upon which, after all, the diagnosis of Gaucher's disease depends, is sufficiently true to type to make an example of this rare condition worth recording. I am indebted to Dr. W. E. Robinson for permission to do so.

Medical Societies.

PATHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

A MEETING of this Society was held at the Royal Army Medical College, Millbank, on July 11th and 12th, Lieut.-Col. H. MARRIAN PERRY, R.A.M.C., being in the chair.

J. W. MCLEOD, W. MACADAM, and B. WHEATLEY (Leeds) discussed the possible significance of hæmolytic intestinal bacteria in the causation of anæmia. Hæmolytic streptococci are rare in duodenal contents, and they thought that attention might profitably be directed to the hæmolytic hæmophilic organisms which are found in about 55 per cent. of normal throats and in some cases in the bowel.

R. CRUICKSHANK (Glasgow) described the ill-understood *Bacillus lipidus*, especially in respect of its occurrence in the stools of infants and its relation to changes in reaction.

C. H. BROWNING and R. GULBRAUSEN (Glasgow) had found that the acid-fastness of the tubercle bacillus could be readily removed by fat solvents which were acid—e.g., trichlorethylene—or neutral solvents (such as chloroform) to which minute amounts of acid had been added, leaving well-formed ghosts behind.

H. A. HAIG (Cardiff) described two cases of streptothrix infection: one beginning in the appendix and spreading over the abdomen, due to *Nocardia israeli* and successfully treated with potassium iodide; the other, caused by *Actinomyces bovis*, commencing in a rib and spreading through the thorax to the brain with involvement of the heart, which is very rare.

J. K. CLARKE (London) had experienced two cases of subacute infective endocarditis from which he has isolated by blood culture *Streptococcus mutans*, the pleomorphic organism constantly associated with the early lesions of dental caries.

H. W. CROWE (Harrogate) demonstrated the characteristic colonies of the different streptococci grown on his chocolate medium, correlated the groups thus defined with those described by other workers, and outlined a scheme of classification.

G. C. CAMERON and H. B. MAITLAND (Toronto) described the course of a transmissible rabbit encephalitis which they had met with, and C. DA FANO (London) detailed the microscopical characters of the parasite (apparently a microsporidium) with some very clear lantern slides.

J. M. BEATTIE (Liverpool) dealt in a comprehensive way with his experiments on foot-and-mouth disease in rats. The original virus came from the lymphatic glands of cattle which had been in contact with infected animals and was carried successfully from rat to rat through three passages with dorsal œdema of the feet, and vesicles on the feet and tongue as characteristic symptoms. The animals also showed a peculiar gelatinous œdema of lung which he had found in wild rats, especially in areas of Liverpool, in possible contact or communication with places where frank bovine foot-and-mouth disease had occurred. These wild rats, however, failed to infect normal experimental rats, and the opinion was generally expressed in the discussion which followed that whether the lung condition had anything to do with foot-and-mouth disease or not, it was commonly found in adult laboratory and wild rats in many places.

W. J. WILSON, J. H. DUNN, and E. M. MCV. BLAIR (Belfast), in extensive observations of the influenza epidemics of 1919, 1922, and 1924, found the serum of influenza cases to agglutinate Pfeiffer's bacillus freely and almost constantly, the reaction being manifest in the first few days of the disease and disappearing soon after defervescence. The most important point is to have an emulsion which is readily agglutinable, and this can be tested with sera preserved from times of epidemic prevalence by the addition of an equal volume of glycerine. Many controls and 25 cases of lethargic encephalitis gave negative results, except in a few cases of pulmonary tuberculosis, bronchitis, and pneumonia.

E. G. D. MURRAY (Cambridge) showed what a great influence the composition of the culture medium might have on the virulence of the meningococcus; amino-acids are important, but the results cannot be accurately predicted and have to be obtained by direct animal test in each case.

F. W. ANDREWES (London) showed how the relative quantities of specific and group agglutinins could be accurately evaluated in bacteria of the Salmonella group by graded quantitative absorption.

P. HARTLEY (London) showed that antigens and antibodies in serum could be satisfactorily preserved as dry preparations by precipitation with ether-alcohol mixtures in the cold and reconstituted by solution in water. In the system horse-serum-horse-precipitin, ether extraction of either component made little or no difference in the result, but if both were used in the extracted state no precipitate was formed. The same author also described experiments showing that radiation with ultra-violet light or the carbon arc did not enhance the capacity of guinea-pigs to produce antitoxin or rabbits to generate typhoid agglutinins, consonantly with the recent finding that the increase in the bactericidal power of the blood caused by radiation is due to influence on the phagocytes.

C. C. OKELL and E. E. BAXTER (London) described their experiments with the toxin of the Dick and Dochez streptococci used in the manner of the Schick test to measure susceptibility to scarlet fever. The toxin is neutralised with the serum of scarlet fever convalescents. No animal gives satisfactory results. Their tests showed fairly good correspondence with the clinical histories.

W. MAIR (London) suggested that it was premature to conclude that the reaction was a test for susceptibility to scarlet fever as well as a test for susceptibility to the toxin of these particular streptococci.

D. B. STEABBEN (London) found that metallic sols, gelatin, agar, peptone, and other colloids characteristically led to an immediate concentration of the blood and leucopenia followed by a leucocytosis—a response not given by crystalloid substances. The colloids had no effect on an existing antibody content, but there was some indication that they improved the response to a fresh dose of antigen.

J. MCINTOSH and L. E. H. WHITBY (London) had made further attempts to stimulate antibody production with salts of lead manganese and beryllium with completely negative results.

R. A. WEBB (Cambridge) found that an intravenous dose of meningococci given within 24 hours of another bacterial antigen resulted in sudden death with epileptiform convulsions.

A. PINEY and A. B. ROSHER (London) failed to find any relation between antibody production and lymphocyte response in the blood.

S. P. BEDSON (London) in guinea-pigs found that splenectomy led to an increase in blood platelets to about twice their normal number for about a month. During this period antiplatelet serum will reduce the number of platelets as in normal animals and will give purpura if the dose is large enough.

M. E. JOHNSTON (London) had worked out in detail the immunity to antiplatelet serum and had found no evidence of the existence of anti-antibodies.

P. HARTLEY mentioned anaphylactic experiments which led to the same conclusion.

J. F. GASKELL (Cambridge) showed that to produce lobar pneumonia in rabbits a small intratracheal dose of highly virulent pneumococci was necessary; larger doses led to general infection of the serous cavities.

J. C. G. LEDINGHAM (London) emphasised the fact that the reaction to vaccinia is essentially in the reticulo-endothelial system; it has no special affinity for epidermis.

J. A. ARKWRIGHT and S. S. ZILVA (London) found that a lowering diet, qualitatively or quantitatively, much diminished the inflammatory response to diphtheria toxin and other skin irritants.

A. LEITCH (London) had made many experiments by putting gall-stones, sterilised pebbles, pillules of pitch &c., into the gall-bladder of guinea-pigs; the animals mostly died in 6-12 months, and in a number of cases showed hypertrophic epithelial growth which in some instances was frankly invasive and malignant.

B. R. G. RUSSELL (London) showed that spontaneous mouse cancer exhibited the same activity in pentose metabolism as the transplanted tumours.

A. PINEY described a case of plasma-cell leukæmia, but hardly convinced the meeting that his interpretation of the nature of the cells was correct.

J. S. DUNN, A. HAWORTH, and N. A. JONES (Manchester) described the anatomy and histology of experimental oxalate nephritis and correlated the excretion of urine and urea and the blood-urea with the anatomical changes.

J. S. DUNN mentioned a case of pulmonary embolism with marrow tissue in a rabbit which had fractured several vertebræ.

G. H. WILSON (Birmingham) described an example of the rare pyelitis cystica in which submucous epithelial nests, arising possibly from inflammatory distortions, degenerate and leave multiple small cysts in the urinary tract.

K. GOADBY (London) demonstrated the lung of a Cumberland ironstone miner who died of phthisis with an X ray picture of his chest taken five years previously.

G. L. CHEATLE (London) showed a section through the whole breast in Paget's disease; G. HADFIELD (Bristol) a suprarenal tumour associated with virilism; T. LUMSDEN (London) mammalian tissues growing in pure serum of the right reaction in vitro; T. S. P. STRANGEWAYS (Cambridge) in vitro tissue cultures showing inflammatory cytological changes; G. H. WILSON a lithopædion; G. S. WILLIAMSON (London) his method of mounting museum specimens in celloidin jars; H. M. PERRY and J. A. MANIFOLD (London) a variety of pathological specimens, and N. S. LUCAS (London) osteitis deformans in a kinkajou, primary carcinoma of the liver in an oryx, leukæmia in an ocelot, and bone formation with bone-marrow in the aorta of a cockatoo from the Zoo.

EDINBURGH MEDICO-CHIRURGICAL SOCIETY.

A MEETING of this Society was held on July 2nd, Sir DAVID WALLACE, K.B.E., the President, being in the chair.

Dr. ROBERT HUTCHISON opened a discussion on

Visceroptosis.

He said that this subject was of interest not only to the anatomist, the pathologist, the neurologist, and the psycho-neurologist, but also to the physician, surgeon, and gynæcologist; yet its genesis was still little understood, and its diagnosis and treatment were still complicated by practical problems. The practitioner saw much of this condition, especially amongst women. Dr. Hutchison classified visceroptosis under two heads—viz., the so-called congenital (or "virginal") and the acquired ("maternal") types. Many reasons had been put forward from time to time to explain its greater frequency in women, but such influences as poor muscular development due to insufficient exercise, tight lacing, straining as the result of constipation, the shallow pelvis, and bad posture were in themselves not sufficient to produce drooping of the viscera or a train of symptoms. Dr. Hutchison was inclined to regard the condition more as part of a general state. These patients, who were lacking in muscular tone, showed other evidences than merely a drooping of the abdominal contents. Stiller's description of the "Morbus asthenicus" or "Habitus ptoticus" was referred to, and the speaker believed that this gave a fuller and clearer idea of the condition. Reference was also made to the work done on this subject by Sir Arthur Keith. As a physician the speaker had rarely met with the so-called virginal type amongst children, and he doubted very much if the condition was really congenital; but in this connexion he was anxious to have the opinion of a surgeon who was accustomed to perform laparotomies on children. The acquired form was more common, and he referred to the well-known factors in its production, such as weakening of the pelvic floor, stretching of the abdominal muscles, and absorption of the abdominal fat. Of bands and kinks Dr. Hutchison thought that these had a congenital origin and were not the result of stress and strain; but here again a surgical opinion would be helpful. With regard to the symptomatology, it was a question whether visceroptosis per se was capable of producing symptoms, but the improvement which was so commonly found in congenital cases, when these women became pregnant, favoured the belief that the mechanical results of dropping of the abdominal viscera could not be altogether ignored. At the same time, every practitioner was constantly meeting with cases of the acquired variety who were entirely free from symptoms. This led Dr. Hutchison to the conclusion that besides the actual dropping of the viscera there must be other factors present before symptoms were produced. Walton's view was that the presence of bands causing kinks in the gut was the direct cause of the symptoms, but division of the bands did not always give the patient relief, and Dr. Hutchison believed that functional incapacity of certain organs must also be considered as a causal factor. Visceroptotic patients frequently suffered from atony of the bowel, and deficient secretion of gastric juice, and these conditions must also be considered as a means whereby symptoms were produced. The relation of visceroptosis to neurasthenia and the neuroses was of great importance, and this immediately raised the question: Does visceroptosis cause neurasthenia or are both manifestations of the "Morbus asthenicus"? It was common knowledge that depressing emotions lowered visceral tone, and this in itself was apt to set up a vicious circle. It was really a question whether the drooping and atony of the bowel could lead to the mental depression and loss of emotional tone, as the two coexisted so frequently. These patients were often so introspective that it might be concluded that their abdominal complaints were only a cloak for some concealed mental conflict, and that in reality they were suffering from an anxiety neurosis. The physician was too apt to neglect this side of the picture. Though the diagnosis of visceroptosis was easy, the real problem at the bedside was to confirm the opinion that the symptoms were the direct result of it. There was always the possibility that the visceroptotic abdomen might also be the seat of organic disease. Visceroptosis was a great mimic, and all the known means of physical diagnosis should be employed. Finally, if any doubt existed, Dr. Hutchison recommended surgical exploration, the object in view being fully explained to the patient. From his experience of these cases the speaker did not believe that visceroptosis, per se, produced such organic conditions as gastric and duodenal ulcers, but he was inclined to think that gall-stones might follow on it. With regard to treatment, the mental factor was, perhaps, the most important, and at the same time the most difficult. He was in general agreement with the usual lines of medical treatment. The fattening cure had its ardent supporters, and there was no doubt that, combined with the usual physical treatments and abdominal supports, it often gave good results. The early detection of these cases was of importance, for they were then more responsive to treatment. He did not consider a case cured until there was an absence of symptoms for at least five years. Referring briefly

to surgical treatment, Dr. Hutchison doubted very much the value of fixation operations.

Mr. JOHN FRASER said that in his experience intussusception only occurred in those children who were the subjects of visceroptosis, and this led him to the belief that the condition was congenital in origin. He referred to the embryology of the intestinal canal, and pointed out that the sympathetic nervous system was probably deficient in this variety of visceroptosis.

Prof. WILLIAM RUSSELL said that the importance of testing the functional capacity of the stomach in these cases could not be over-rated. It was essential to treat patients along these lines, and he agreed with the view that repeated pregnancies tended to produce the condition.

Sir HAROLD STILES was in complete agreement with Mr. Fraser as to the congenital origin of the condition. It was his custom to recommend proper physical training in such cases, with good results. Many cases exhibited a loss of balance between the vagus and sympathetic nerve-supply. He would only operate on the visceroptotic patient at the expressed desire of the physician, and then as a last resort.

Dr. HAIG FERGUSON, speaking as a gynæcologist, said that surgical interference was always necessary, because ligaments had been stretched, and this gave rise to ptosis, which in its turn was responsible for the marked constipation. Obstetricians had been blamed for much, but though he was against early rising after parturition, he encouraged his patients to move about gradually in bed, and by the use of graded muscular exercises loss of tone was prevented. Ptosis of the kidney was frequent in thin women after childbearing, and he had found the fattening cure particularly useful in this condition.

Prof. EDWIN BRAMWELL laid special emphasis on the psycho-neurological aspect of visceroptosis. They were admittedly difficult cases to handle, but only harm was done by those who attempted to explain away symptoms on purely anatomical evidence.

Prof. D. P. D. WILKIE said that there was some confusion of thought regarding visceroptosis in childhood. The motile cæcum, to which reference had been made, could be regarded either as a local condition which might be dealt with surgically, or as part of a general visceroptosis, and in this latter condition local surgical treatment was of no value.

Mr. W. A. COCHRANE described briefly the statics of visceroptosis, and showed how much could be done by correct posture and suitable exercises.

Dr. FREDERICK PORTER inquired whether trauma could be a factor in the production of visceroptosis.

Dr. HUTCHISON, replying, said in his experience he was convinced that visceroptosis was uncommon in children, and to the last speaker's query he would say that he did not think that trauma could be a factor in the production of this condition.

Exhibition of Clinical Cases.

Sir HAROLD STILES demonstrated two cases after operation for acoustic tumours. He described briefly the clinical findings in each case, and described his operative technique. A patient after operation for a spinal root tumour was also shown. This man had been regarded as an atypical case of progressive muscular atrophy, and at operation a vascular tumour was successfully removed. Since then there had been a steady improvement in all the symptoms and the patient was now able to walk.

Mr. J. W. STRUTHERS showed a case of multiple exostoses. Keith had suggested the name diaphyseal aclasis for this condition. Emphasising the importance of a thorough investigation of all cases of hæmaturia, however transient, Mr. Struthers showed two patients after removal of malignant tumours of the kidney, in whom the earliest sign had been the passage of blood in the urine, and this at the first onset had not been fully investigated. He also showed specimens from a case in which a patient suffered from fracture of the femur, paraplegia, &c., due to secondary deposits from a small "latent" malignant tumour.

Reviews and Notices of Books.

CRIME AND INSANITY.

By W. C. SULLIVAN, M.D., Medical Superintendent, Broadmoor Criminal Lunatic Asylum. London: Edward Arnold and Co. 1924. Pp. 259. 12*s*. 6*d*.

Dr. Sullivan follows closely the principle that the only method of investigating the relation of psychopathology to crime is the clinical examination of the individual criminal, and he arranges his ample material in accordance with the form of the mental disorder present. The modes of reaction peculiar to alcholism, dementia præcox, epilepsy and systematised delusional insanity are shown by case-histories not only of clinical but of psychological interest. The sufferer from dementia præcox, for example, may recognise the homicidal impulse as independent of and irrelevant to the rest of his conscious personality, and the lucid accounts given by such patients, often without attempt at excuse or rationalisation, offer a fascinating problem in psychology and give point to a later remark that the McNaghten rules would make most insane criminals fully responsible. The author affirms that whilst alcoholism is the most important of the individual morbid factors of crime, yet it is of very small account in the insanity of the asylum. The fluctuations of psychiatric doctrine now place in the dementia præcox group most of the cases formerly described as paranoia; yet paranoia has exerted an unfortunate influence on legal conceptions of morbid psychology, which attribute a grossly exaggerated importance to delusion and ignore almost entirely the primary and dominant influence of morbid impulse. It is noteworthy that, although epilepsy often serves where a defence of insanity would be otherwise feeble, the incidence of epilepsy is the same in the criminal lunatic population as in the inmates of ordinary asylums.

In the excellent chapter on transitory mental disorders attention is paid to the genuineness of the amnesia so often claimed, but the possibility of restoring the lost memories is not considered, and the generalisation that the most emotional impressions in neurotic dream states are more likely to be retained (perhaps one should say "*recalled*") does not agree with the findings in the numerous amnesias after "shell-shock." The use of statistics of criminal lunacy to confirm the view that the psychopathological factor is of little importance in acquisitive crime unduly narrows the meaning of "psychopathological" and excludes those mental disturbances which lead to minor delinquencies. It is plain, however, that the cases of this nature described by Dr. Hamblin Smith in his "Psychology of the Criminal" are not only in a legal category different from that in which Dr. Sullivan's are placed, but differ also in being accessible to treatment by analysis. The legal conception of insanity, therefore, is correlated with some fundamental psychological condition. A hint of the nature of this condition is supplied by Dr. Sullivan when he notes a relation between the behaviour of the dementia præcox patient and the Freudian theory of the Œdipus complex. It seems as if these patients live in the world of unconscious fantasy, whilst the merely psycho-neurotic—like Dr. Hamblin Smith's subjects—are influenced by unconscious fantasy but are able to judge it by reality standards when it is revealed to them by analysis.

The study of clinical material leads of course to the question of responsibility, and Dr. Sullivan claims for psychiatry only the right to ask how far the legal criteria of responsibility are adapted to secure the ends which the law has in establishing them. The question reveals a tangle of inconsistencies created by our inheritance of the belief that disorder of intellect is the sole criterion of insanity. The difficulties of the McNaghten test have been

circumvented by evasion or distortion of the legal formula, and the result of the test itself may be abrogated by the statutory inquiry prescribed in cases where the Secretary of State has reason to believe that a prisoner under sentence of death is insane. Following upon the case of R. *v.* True, the Atkin Committee recommended that irresistible impulse should exclude responsibility, but Dr. Sullivan shows that even with this addition to the test the ends of the law are not attained. The content of the delusion is still a criterion, and the lunatic is still responsible who murders a supposed persecutor under the delusion that his fancied enemy is reading his thoughts. The author's remedy for this curious product of legal psychology and for other difficulties is to replace *ex parte* evidence, given in the form of artificial and fragmentary replies to more or less relevant questions, by a full and connected statement by impartial witnesses. This would reach at the outset the result now attained by the tedious stages of trial, appeal, and revision by the Secretary of State.

Dr. Sullivan writes with well-earned authority and the book is an important and valuable one. It should receive the attention of all to whom an understanding of the subject is necessary.

THE NERVOUS CHILD.

Third Edition. By H. C. CAMERON, M.D., F.R.C.P., Physician in Charge of Children's Department, Guy's Hospital. London: Humphrey Milford, Oxford University Press. 1924. Pp. 233. 7*s.* 6*d.*

THE two previous editions of this book have already won for it an established place in the literature of children's diseases. The third edition, which now appears as a further testimony to the popularity of the work, contains relatively little new matter. Additions have been made to the chapter dealing with various signs of nervousness. The chief alterations are found in the chapter on Nervousness and Physique, which has been enlarged and enriched by a series of excellent photographs illustrating the types described, among others, the type to which Dr. Cameron has given the name of "status catarrhalis." It is not altogether easy to understand the author's reluctance to class these cases as rickets because of the inconstancy of bony changes; moreover, it seems to be of some importance that both parents and medical men should recognise that the factors in the production of this type are those of rickets—nutritional and environmental—rather than hereditary, as in so many other types of nervous children.

This book contains a large amount of material for which place cannot be found in a general text-book, and will continue to be of the greatest value in providing the practitioner with a practical scheme for the regulation of the child's environment.

AN INTERNATIONAL YEAR-BOOK OF CHILD CARE AND PROTECTION.

Compiled from Official Sources by EDWARD FULLER. London: Longmans, Green and Co. 1924. Pp. 448. 7*s.* 6*d.*

Mr. Fuller, who is editor of the *World's Children*, has compiled this year-book from official sources with the intention of providing as complete a record as possible of State and voluntary effort for the welfare of the child, including education, care of the delinquent and destitute, and conditions of juvenile employment throughout the world. The year-book is published for the Save the Children Fund and contains an introduction by Mr. Percy Alden, M.P., chairman of this fund and hon. secretary of the British Institute of Social Service. An attempt has been made to deal with all the countries scheduled on a uniform plan, although this aim has been impeded by the fact that in a number of countries the term "child welfare" is so construed as to include the care of destitute children, undertaken here by the Poor-law authorities. A transcript of supra-national agreements and laws relating to child life is included, and the Declaration of Geneva. Inequality is inevitable in the first appearance of a new and comprehensive work of this kind, and Mr. Fuller would welcome (at 26, Gordon-street, London, W.C.) criticisms and suggestions from readers for a later edition. The attempted compilation of names to form "An International Who's Who" is not feasible; such a list would be of value for reference at the offices of the Fund, but glaring errors of omission or commission can hardly be avoided. The year-book will be used wherever the particular interests of children come up for consideration.

THE PHYSIOLOGY OF COLOUR RESPONSE.

The Pigmentary Effector System. By L. T. HOGBEN. Edinburgh: Oliver and Boyd. 1924. With 17 figures in the text. Pp. 152. 10*s.* 6*d.*

BY the "pigmentary effector system" the author means the apparatus by which animals such as chameleons, frogs, and fishes change their colours, which they do mostly in relation to changes in the colour and illumination of their surroundings. The change is generally brought about by movements of the pigment granules which are contained in special branched cells in the skin, though it is not certain whether the whole cell contracts or expands or whether the granules move inside the cell. An ordinary frog in dry white warm surroundings in a bright light is quite pale; the pigment granules are collected together in small isolated masses. In a wet, black, cold, and dusky environment the same animal in about a couple of days becomes black owing to the dispersion of the granules throughout the cells which contain them. The author, with Mr. F. R. Winton, has shown that the reaction is in this case under the control of the pituitary. The middle and posterior lobes contain a substance which induces expansion of the pigment and darkening of the skin; the reaction is of such delicacy that it would seem of likely utility in the pharmacological assay of pituitary extracts. Frogs from which the pituitary has been removed become and remain permanently pale with contracted pigment; they may be darkened by the injection of pituitary extract. In reptiles the responses are rather different and adrenalin has at least a considerable share in bringing them about. In fishes the nervous system plays an important part. In crustacea the pigment-bearing cells are multicellular organs with, in some cases, a variety of pigments which behave differently under different circumstances.

We have here a most interesting account of a phenomenon which in one form or another is widespread. The book is the first of a series of biological monographs and manuals under the editorship of Dr. F. A. E. Crew, of Edinburgh, and Mr. D. W. Cutler, of Rothamsted, and if the succeeding volumes reach the same standard they will be useful additions to scientific literature. The publishers might reconsider the format; the type and pages are too big.

INCOMPATIBILITY IN PRESCRIPTIONS, AND HOW TO AVOID IT.

By THOS. STEPHENSON, D.Sc. Edinburgh: *Prescriber* Office. 1924. Pp. 32. 1*s.* 6*d.*

THIS pamphlet is a reprint of articles contributed to *The Prescriber* by its editor, together with some additional matter.

A definition of incompatibility is quoted as "any unintentional change which notably interferes with the elegance, usefulness, or safety of a prescription," and such changes are grouped into three classes: (1) chemical, (2) physical or pharmaceutical, and (3) therapeutic, though both chemical and physical changes might be described as pharmaceutical. Cases of chemical incompatibility are fully and systematically described as occurring when: (*a*) an insoluble compound is precipitated; (*b*) gas is evolved; (*c*) an acid and an alkaline substance are mixed; (*d*) one of the ingredients is decomposed; (*e*) an

alkaloid is precipitated; (*f*) an undesirable compound is formed. Each section is discussed in detail, and all likely cases of incompatibility are indicated. Perhaps the most noteworthy feature is the inclusion of a subsection dealing with explosive reactions. This should be of great value to all physicians and practitioners, many prescriptions being quoted of which the extremely dangerous nature might easily be overlooked. Potassium chlorate and other oxidising agents are the most likely causes of trouble in this respect. Although nitroglycerine is safe in 1 per cent. alcoholic solution, the latter on dilution deposits the nitroglycerine as an oil, which is very highly explosive. The safest method of prescribing nitroglycerine, therefore, is in chocolate tablets. Cases of physical incompatibility are classified under the headings of: (*a*) insolubility; (*b*) immiscibility; (*c*) undesirable colour change; (*d*) unsuitable consistence or excessive bulk; (*e*) molecular change, as formation of liquid on mixing solids. A brief section deals with therapeutic incompatibility, and a very useful table of incompatibilities of all the usual drugs is given. An adequate index forms a valuable addition too often omitted from short works of this type.

The statement that acetyl-salicylic acid (aspirin) decomposes potassium iodide with liberation of iodine requires qualification, as this reaction cannot take place if both substances are reasonably pure. On p. 21 we find: "Many of the water-soluble metallic salts, and especially those that are deliquescent, are insoluble in alcohol, and the addition of any spiritous preparation, such as a tincture, often throws such salts out of solution." This is quite true, except for the words "those that are deliquescent," as actually it is the non-deliquescent salts which are least soluble in alcohol. The author states, with a certain amount of scepticism, that "sodium bicarbonate is also said to convert calomel into corrosive sublimate, but no toxic effects appear to have been observed from such a combination." The scepticism is certainly justified.

The pamphlet gives in a convenient form and at a low price information which at any time may be of the greatest value. The subject is of importance to those who prescribe and those who dispense, and it is possibly of even greater moment to the former, as they are less likely to be made aware of the incompatibility by seeing its results themselves. This practical little work should prevent them from falling into any of the pitfalls.

HANDBUCH DER BIOLOGISCHEN ARBEITSMETHODEN.

Edited by Prof. Dr. EMIL ABDERHALDEN. Berlin: Urban und Schwarzenberg. Section 112, Verdauungsapparat. Swiss Fr.19·9. Section 122, Untersuchungen an einzelligen Lehewesen. Swiss Fr.7·5. Section 125, Immunitätsforschung. Swiss Fr.4·5. Section 126, Untersuchungen des Harns. Swiss Fr.4·8. Section 127, Nahrungs- und Genussmitteluntersuchungen. Swiss Fr.11·4. Section 128, Die Methoden der Medizinescher Statistik. Swiss Fr.7·8. Section 129, Funktionen Bestemmeter Organe. Swiss Fr.7·5.

OF the six sections of this admirable system recently published, Section 112 deals with the investigation of saliva, fæces, intestinal gases, and gastric contents. Minute details are given with regard to academic investigations. The more modern clinical investigations are less well covered; thus there is in the section dealing with fæces no reference to the microscopic appearance. Again, in the description of the methods of examining gastric contents modern work on the fractional methods of investigation is not mentioned. Section 122 contains detailed accounts of the various methods of investigating unicellular organisms of the plant and animal kingdom and a good account of staining and microscopic methods is given. The part dealing with microscopic research is full, and contains descriptions of many useful techniques. But it is for Section 125 of the series that the handbook is best known to the pathologist and bacteriologist.

The volume under review contains an account of the methods of demonstrating the Pfeiffer phenomena and of the preparation of bactericidal sera, and also an account of the von Pirquet reaction; its contents are of great practical value to laboratory workers in pathology. Section 126 is devoted to the chemistry of various amine bodies in urine and forms a complete and exhaustive treatise on the subject. Although outside the sphere of ordinary biochemical work, this volume would prove of the greatest value to any person working at this particular branch. Section 127 contains descriptions of methods of investigating alcoholic beverages and tobacco. The descriptions are of a purely technical nature and, as elsewhere, the treatment of the subject is exhaustive. Section 128 opens the part of the work dealing with medical statistics. It commences with a general account of the subject and then proceeds to describe the various methods used in the German State Departments for working out the various statistical records such as death-rates and birth-rates. It is interesting to contrast the German methods and findings with those in this country. Section 129 is of particular interest since it describes the methods of investigating, by animal experiments, various organs such as the pituitary and suprarenals. Detailed accounts are given for the methods of extirpation of these organs and an excellent series of photographs demonstrating the results in various animals. The accounts, therefore, are likely to interest physiologists. In no other single volume is it possible to obtain descriptions of these operations, and sound pharmacological information is also provided. Altogether, it is difficult to praise too highly the industry and sense of balance shown in the compiling of this great work.

PRÉCIS DE CHIMIE PHYSIQUE.

By H. VIGNERON. Paris: Masson et Cie. 1924. Pp. 403. Fr.30.

THIS little volume deals with physiological chemistry in a very efficient manner and the mathematics are kept within such bounds as could be understood by most readers. Very good accounts are given of Langmuir's theories and also of the application of the Le Chatelier theorem. The section dealing with the theory of ions, and particularly hydrogen-ion concentration, is disappointing, and in parts almost unintelligible. On the whole, however, the explanations are clear and the line drawings are particularly useful.

ANATOMY OF THE TEETH.

The Microscopic and General Anatomy of the Teeth, Human and Comparative. Second edition. By J. HOWARD MUMMERY, C.B.E., F.R.C.S., L.D.S. London: Humphrey Milford, Oxford University Press. 1924. Pp. 618. 35*s*.

So much new matter appears in this new edition of Mr. Mummery's well-known book that it must be considered as a fresh publication. The book is nearly doubled in size by the addition of a section dealing with the macroscopic human and comparative anatomy of the teeth. Thus the whole syllabus in dental anatomy required for the L.D.S. and other dental degrees is comprised in one volume. This will undoubtedly prove a great convenience to the student who hitherto, if he has wished to use this book, has been compelled to purchase in addition some other book dealing with comparative dental anatomy.

The first part, covering the microscopic anatomy of the teeth, is not very different from this section of the work as it appeared in the first edition. The chapters on calcification have been rearranged and should help the student to understand better this very difficult subject. An account of the author's discovery of vaso-motor fibres to the vessels of the pulp is included. The second part of the book commences with an admirable description of the anatomy of the human teeth. The tendency is for examiners to lay a greater stress on a knowledge of the teeth of man. They rightly expect the student to know them in

detail, for without such knowledge the practice of dentistry must be empirical. The illustrations to this section are extremely good; indeed, they are the best we have ever seen. The various theories of tooth development are described in considerable detail, and include Bolk's dimeric theory. Mr. Mummery has wisely not attempted to describe the dentition of the vertebrates in detail. Such knowledge is not necessary to a dental student. The inclusion of this subject in the syllabus is designed to illustrate the process of evolution by reference to the teeth, which exemplify the nature of adaptive modification almost better than any other structure. A broad sketch which emphasises those aspects of evolutionary significance but omits minor details of less importance is just what is required in a book of this kind, and Mr. Mummery supplies it. The account of the evolution of the dentitions of the horse and elephant, for instance, is excellent. The illustrations are produced on plates printed on art paper instead of being interspersed in the text. They are all original drawings and are extremely good. The book is singularly free from errors. "Thalycine" should, of course, be thylacine. A full index curiously enough omits any reference to the dental pulp.

A special word of praise is due to the publishers for the way in which they have produced the book.

THE DEVELOPMENT OF THE HUMAN BODY.

Seventh edition. By J. PLAYFAIR MCMURRICH, Professor of Anatomy in the University of Toronto. London: Henry Kimpton. 1924. Pp. 506. 18*s*.

THIS book has gained a prominent place among works on human development by reason of its clear expositions and of the large amount of information contained in it. The present edition, although it has been altered in some ways, shows no diminution in these excellent qualities, and we observe a number of new illustrations. There are a few slips in the editing of the book which might have been avoided—for example, the reference on p. 488 to Fig. 285 ought to be 288, and in Fig. 186 the subject discloses an affection for standing on its head which we imagine is really not intended by the writer. In spite of the fact that in some details the accounts of development are not quite those adopted in English text-books—possibly owing to the author's decided preference for German work—the seventh edition of Prof. McMurrich's little book can be heartily recommended to those who wish to obtain a comprehensible and fairly comprehensive view of the matter of which it treats.

RESEARCH IN DAIRYING:

OPENING OF THE NATIONAL INSTITUTE.

ON July 19th the formal opening took place of the National Institute for Research in Dairying at Shinfield, near Reading, when a large company representative of those interested in dairy problems were entertained by Lord Elveden, chairman of the governing board. When a scheme of agricultural research was formulated under the Development and Road Improvement Fund Act, 1909, by the Board of Agriculture, Reading was chosen as the centre for dairy investigations, and in 1912 the Research Institute in Dairying was established at University College, Reading. At the outset the Institute had to depend for its material on supplies from the College farm and the British Dairy Institute of the College, but in October, 1920, the Shinfield Manor Estate of about 350 acres was secured, and an experimental farm was started with the farm buildings then in existence. In June of the following year, by means of a grant from the Development Commissioners and private donations, the purchase of the estate was completed and the general control of the Institute delegated to a governing board, on which, in addition to the Ministry of Agriculture and the Ministry of Health, several other important agricultural interests were represented. At this time the Institute adopted the title it now bears. Shinfield Manor House has been transformed into a series of laboratories and offices, and additional buildings have been erected at a cost of about £30,000. Towards this sum a grant of £13,000 was made by the Development Commissioners, and the balance is being raised by public appeal.

The Laboratories.

The new laboratories contain a chemical department where work on accessory food factors, as, for example, the source of vitamin A in butter, and investigations into the nature and causes of abnormal milks, and the effect of heat on milk are carried out. In the bacteriological department, under the direction of Dr. R. Stenhouse Williams, investigations are at present being undertaken into such problems as the relative efficiency of steam and dairy disinfectants in sterilising dairy utensils, and the importance of *B. coli* content of milk and its effect on the keeping quality of the milk. The additional new buildings include a dairy, in which an ammonia cold-storage plant has been installed. On the dairy farm a herd of from 40 to 50 cows is maintained, and the new buildings in connexion with this branch of the Institute's activities comprise food stores, granaries, and cowsheds. The library contains over 2000 books and receives bulletins from various colleges and experimental stations.

The Importance of Research Work.

The opening ceremony was performed by Lady Elveden, and lunch was provided in one of the new cowsheds. The toast of the Ministry of Agriculture and the Development Commissioners was submitted by Mr. W. M. Childs, Principal of the University College, Reading. In reply, Mr. J. F. Blackshaw said that the Ministry and the Commissioners had gladly done all they could to develop the work of the Institute. Generous financial assistance had been rendered by Lord Elveden and funds had also been raised from the industry itself, though in that connexion more difficulty had been experienced than ought to have been the case. Research was of the highest importance to dairy farming if they were successfully to meet the competition of other countries, who were engaged in a genuine effort to raise the standard of the industry, both to benefit their own people and to gain a foothold in the British market. Lord Elveden, who presided, in proposing "Prosperity to the Institute," spoke of the future of research in dairying. Around the Institute, he said, there had sprung up an industry which was almost unique—an industry engaged in the supply of wholesome milk from animals that had passed the tuberculin test, which was being sold at prices within the means of even the poorest members of the community. By scientific feeding of the cows it had been possible to produce milk at 2*d*. or 3*d*. a gallon cheaper than many farmers could produce it, and that result suggested most valuable possibilities. Milk production carried the largest amount of labour on the land, and therefore such research as was being carried out at the Institute opened a vista of increasing national prosperity to the countryside. It was encouraging to note that the principles laid down by the Institute had been adopted by the Government of New Zealand, and that the Dutch, too, were proposing to apply them. All over the country farmers in increasing numbers were now seeking to apply scientific methods in their efforts to produce better cattle, cleaner milk, better cheese, and better butter. Mr. E. Matthews (vice-chairman of the board) and Mr. Holt Thomas replied. At the close of the proceedings it was announced that as the result of an appeal for further donations to the Institute sums amounting to £1070 had been subscribed, which sum Lord Elveden intimated he would double.

THE LANCET.

LONDON: SATURDAY, JULY 26, 1924.

THE ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION.

THE annual meeting of the British Medical Association was held this year for the first time in a great industrial city of the north containing no medical school of its own, although Bradford medical institutions have excited the keenest interest far beyond its borders. The LORD MAYOR OF BRADFORD, in welcoming the Association, asked the members to study the experiments in municipal medicine in which the city took great pride, and full use was made of this invitation, with the result that the municipal hospital and municipal clinics of Bradford are now familiar to many who only had known of them previously as subjects of controversy. The lavish hospitality offered by individual citizens—for hotel accommodation is strictly limited in such a purely business community—also brought about the mutual knowledge needed for sympathetic understanding. It is probable, indeed, that the visit of the Association to Bradford has finally assured the continuance of the friendly relations growing up between the official representatives of medical policy and a city which was honestly desirous of running its socio-medical institutions in its own way. Although without a medical school, Bradford is not without academic distinction in medicine, as Mr. BASIL HALL, President-elect of the Association, was at pains to point out in his inaugural address. It is natural that wool-sorters' disease should have been recognised in a city where wool is the chief means of livelihood, and work is proceeding which should result in the total prevention of anthrax without damage to the commercial value of the wool.

The Representative Body, whose labours we report in part on another page, was inclined to exploit still further its expansive mood of last year. The time is approaching when the new home of the Association in the neighbourhood of Tavistock-square will be ready for occupation, and will provide accommodation for the ever-expanding work of the Association, as well as a conference hall with great decorative promise. The membership of the Association now exceeds 27,000, a high-water mark in absolute numbers, although the actual ratio to the number of names on the Medical Register is not yet quite what it was in 1912, and by means of good staff work a large percentage—in some centres almost all—of the newly qualified men and women are being brought into the fold. Consideration of these facts made the Representative Body ambitious to supply all the material needs of its membership. The organisation of benevolent funds and of individual—as distinguished from collective—defence has hitherto been left to other agencies, the devotion and efficiency of which is not questioned. The Representative Body was invited in both instances to refer it to the Council to consider whether these things could not be done and done better by the Association itself, for the Association could no longer afford to remain outside concerns of such vital interest to its members. In the case of benevolent funds the decision was actually taken. The reference in the case of individual defence was only defeated by a very small margin, and feeling in this direction is evidently growing so rapidly that the step is well-nigh a certainty next year. The existing defence societies, which have had a very long start in regard both to time and experience, would hardly find themselves in so good a position as the branch secretaries of the Association for approaching the newly qualified men and women, and for this reason, if for no other, may not remain unwilling to coöperate.

It is now 21 years since the new constitution of the Association came into force, and apart from the activities to which allusion has been made the occasion was thought to demand some formal recognition. The chairman of the Representative Body is accordingly to be provided with some appropriate badge of office. This badge, when it has been designed and produced, will be too late to decorate the retiring chairman, Dr. WALLACE HENRY, whose services during a number of difficult years have been signal. He will, however, be succeeded in the chair by Dr. H. B. BRACKENBURY, for so long chairman of the Insurance Acts Committee, Dr. C. O. HAWTHORNE being elected at the same time as deputy-chairman. The Association is happy in the number of public-spirited men among its members willing to give time and ability in its service.

TEMPERANCE LEGISLATION.

THE Liquor (Popular Control) Bill, which was recently introduced in the House of Lords by the Bishop of OXFORD, was rejected by a substantial majority on the motion for its second reading. We do not find it possible to regret this result, for, though the Bill may have been good in parts—and we think it was—its main proposals seem to have been unwisely conceived, if only because their practical effect, if the Bill had become law, would probably have been anything but beneficial to the cause of temperance. The debate on the second reading was so largely concerned either with points of detail, or with the repetition of the rhetoric traditional amongst controversialists on either side of an intricate question, that the fundamental principles of the Bill were inadequately discussed save in two or three speeches, of which that of Lord DAWSON was specially noteworthy. While it is right that discussion of a social reform so intimately associated with medicine should receive its most weighty contribution from the only medical man among those taking part in the debate, it is a matter for regret that other speakers, enjoying great opportunities for forming opinions, should have confined themselves to detailed criticism. The provisions of the Bill and the speeches delivered in its support certainly indicated a confusion of ideas regarding the scope and object of temperance legislation—a confusion which might perhaps have been dissipated, to the great advantage of the cause of social reform, had the proposals been more carefully scrutinised, and especially had the standpoint taken allowed of a wider range of inspection. What is remarkable about the Bishop of OXFORD'S Bill is not any quality of freshness or originality in its proposals—for the principle of local option which it sought to establish is a very old, and hardly a firm, plank of the extreme temperance platform, but rather the fact that such proposals should be seriously advanced as applicable to the liquor problem in this country at the present time. To advocate the policy of local option as a method of abating the evils of alcoholism in this country to-day seems to us to indicate a singular indifference alike to the nature and

effect of that policy and to the facts of recent experience in regard to the whole temperance question.

Local option, to have any *raison d'être* at all, presupposes the existence of local diversities of opinion, so that the effect of its adoption would be a partial prohibition, resulting in an irregular patchwork of areas where the sale of alcohol is illegal and of areas where it is permitted, whether under private or public ownership. Now the criticisms of prohibition as an unwarranted extension of legal control over individual liberty, whatever be the value of such criticisms, apply equally to prohibition in large and in small areas. And—which is of more practical importance—the mischievous results which are apt to follow from the legal repression of the sale of alcoholic beverages will certainly not be less, and may be greater, when prohibition is established in a patch fashion over small areas than when it is extended to an entire country. This was a matter of common experience when local option was in force in the United States, and the difficulty of dealing with these evils was, in fact, one of the stock arguments for the wider policy of national prohibition. That similar results would follow from the adoption of this policy in England is foreshadowed by what is found in areas where Sunday closing is in force; and the mischief in this country would be the more deplorable because it would mean the undoing of the most effective and rational scheme which has yet been evolved in the history of temperance legislation. Why, in the discussion of the Bishop of OXFORD'S Bill, were the speakers on either side coy in their references to the Licensing Act of 1920, which embodied the essential features of the system of physiological control of the liquor trade, devised by Lord D'ABERNON and enforced by the Central Control Board during the war? Possibly a policy which rejects alike the attitude of laissez-faire in face of a grave and remediable social evil and that of fanatical repression on the score of possible abuses, can hardly be expected to arouse enthusiasm in the clash of contending and equally intemperate opinions. However that may be, the perusal of the debate in the House of Lords certainly left the impression on those medical men who attempt to look at things as they are that the speakers failed to recognise the extent of the change, we may say revolution, which has been brought about in the national alcoholic consumption through the application of the policy of control. Still less does it seem to have been perceived that this policy of control, which has wrought so salutary a change, is wholly irreconcilable with all such attenuated forms of prohibition as local option, Sunday closing, and the like. The system of physiological control was deliberately designed with a view to checking excessive drinking while allowing full opportunity for the safe and temperate use of alcoholic beverages. In pursuit of that aim, the restrictions on the hours and conditions of sale of alcoholic liquor were arranged so as to avoid any risk of providing an adequate motive for organising an illicit traffic in alcohol. The practical disappearance of delirium tremens from the wards of the Poor-law infirmaries, the enormous fall in the registered death-rate from alcoholism and from cirrhosis of the liver, the large reduction in the amount of grave alcoholic crime—all these facts are sufficient proof that the great decrease of public drunkenness under control was not associated with any development of illicit traffic in drink. For it is, of course, the rule, as a priori considerations would suggest and as the experience of America amply proves, that a clandestine trade in liquor is always a trade in concentrated and impure spirits, which are apt to have a specially injurious effect on health, so that any extension of secret distilling or shebeening promptly becomes revealed in the statistical movement of alcoholic disease and mortality. The absence of any such reaction since the enforcement of the policy of control shows quite clearly that the restrictions on the legal hours of sale have always been within the limits of safety; the close times have never been long enough to make systematic violation of the law worth while. A trivial amount of shebeening no doubt exists for the most part in areas under the corrupting influence of Sunday closing, but it is certainly not more frequent than it was before the days of control. And Sunday closing has also to be related to another manifestation of abnormal intemperance—namely, the use of methylated spirits as a substitute for the ordinary alcoholic beverages. It is pointed out in Licensing Statistics for 1922 that, while methylated spirit drinking accounts for only about 0·7 per cent. of the total number of convictions for drunkenness in England and Wales, the proportion of such cases is as high as 21 per cent. in Cardiff, 14 per cent. in Newport (Mon.), and 7 per cent. in Swansea—the chief centres of population which are affected by the partial prohibition of Sunday closing. Such facts as these would seem to suggest that the mixture of temperance policies may be attended with as undesirable results as have been popularly ascribed to the mixing of liquors, and that at all events the advantages which may be obtained by reasonable methods of control are likely to be considerably neutralised when these methods are combined with a partial application of the opposite principle of prohibition.

Within the last ten years the world has seen two great experiments in the legislative treatment of the social problem of alcoholism, and the results are now sufficiently clear to justify a fairly positive opinion as to the respective merits of the two policies which have been tried. In the United States of America it has been sought to remedy the evils of intemperance by absolutely prohibiting the production and sale of alcoholic beverages, by penalising all consumption of alcohol whether moderate or excessive. In this country, on the other hand, the legislature has recognised a distinction between use and abuse, and has limited its interference with the drinking habits of the people to such restrictive measures as will minimise the risk of casual or habitual intemperance. It is possible, of course, that the special conditions of the liquor problem in the United States may be such that the beneficial results of prohibition outweigh its very obvious disadvantages; that is a matter on which foreign opinion might seem impertinent. But it is quite clear that the operation of the system in America has shown that, if applied in this country, its influence for good would be far less efficacious than that of the existing system of control, while its reaction on the health and morale of the population, by its effect in promoting illicit alcoholism and organised defiance of the law, would be highly pernicious. The policy of prohibition, as Lord DAWSON rightly insisted, cannot claim the support of medical science, which condemns the abuse but not the use of alcoholic beverages. If, indeed, the use inevitably entailed the abuse, and if prohibition could really do away with both together, the practical gain might make the policy acceptable on grounds of expediency. But in fact, as the experience of control in this country has clearly shown, it is quite practicable by intelligent regulation to retain the dietetic and convivial consumption of alcohol while eliminating in a very large measure the dangers of excess; and the experience of America has proved to demonstration that prohibition, though it may make moderate drinking illegal, is quite ineffectual in making excessive drinking difficult. With these object-lessons

which recent history has brought out so clearly, it is much to be regretted that the zeal of temperance reformers in this country should be wasted in the advocacy of an attenuated type of prohibition, which would not only be futile in itself, but would tend to weaken and pervert the operation of the really effectual policy of control. This latter policy, of course, is still in a stage of imperfect development, and its elaboration and extension will provide ample scope for reforming activity in the future. It may well be, for instance, that its more thorough application will require the transfer of the liquor trade to public ownership. It should help to make clear the true path of progress if we recognise at the outset that local option and other manifestations of the principle of prohibition can have no place in any such programme of reform. Local option is in theory and in effect the negation of the rational and successful system of physiological control.

ARTIFICIAL PNEUMOTHORAX.

AN interesting stage in the development of any new method of treatment is that in which, after its value has been established, the indications and contra-indications for its employment, and the limitations of its usefulness, are being investigated. Artificial pneumothorax was first employed in the treatment of pulmonary tuberculosis in this country in 1910, over 20 years after its introduction in Italy by FORLANINI. It is now recognised by nearly all workers in tuberculosis here as a valuable addition to treatment, not infrequently helping cases in which the ordinary methods of treatment fail, and restoring to working capacity many patients who otherwise would be condemned at best to chronic invalidism and sooner or later to complete breakdown. The value of artificial pneumothorax is not, however, as widely recognised by the profession at large in this country as its importance deserves; the method is too often regarded as a desperate resort in advanced cases.

We publish this week two interesting papers; the first is by Dr. L. S. T. BURRELL, giving the results of his first 250 cases up to date, and extending and amplifying the information given in the valuable report [1] presented to the Medical Research Council in 1922 by Dr. A. S. MACNALTY and himself; the second paper is by Dr. R. C. WINGFIELD and Dr. G. SELBY WILSON, which forms an admirable complement. This paper deals with the conduct of the cases in which artificial pneumothorax has been employed, correlating certain of the clinical features with the ultimate results obtained. Dr. BURRELL'S results show, what might naturally be expected, that the best results are obtained in patients with moderate resistance to the disease, in whom the condition is unilateral. He finds that in bilateral cases although the immediate results of artificial pneumothorax on the more affected side may be good, relapse usually occurs and the late results are unsatisfactory, though life may be considerably prolonged. In the report to the Medical Research Council, Dr. BURRELL gave categorically his views as to the merits and demerits of this form of treatment. In the present paper he emphasises his opinion that early diagnosis in a great majority of cases enables arrest to be achieved by ordinary methods, and that artificial pneumothorax should be considered not as a routine treatment, but as a safe method of resting the diseased part of the lung where ordinary methods fail, so that while it should not be used for early cases, its consideration should not be too long deferred in cases which do not respond to other methods. He discusses the dangers and the complications and shows that they are not serious enough to weigh against the undoubted benefits that it is capable of conferring upon cases properly selected.

The paper by Dr. WINGFIELD and Dr. WILSON deals with 75 cases treated at Frimley Sanatorium, in 60 of which the induction of the pneumothorax was carried out at the Brompton Hospital. They deal specially with the criteria for estimating the effect of this form of treatment, and do not discuss its value or even the details of its application, such as the spacing of the refills or their amounts. Many observations of great interest emerge from the analysis of their cases. Thus the length of time between the induction and the commencement of exercise has varied from 6 days to 285, with an average of 106. These figures should warn us against expecting dramatic results from the treatment. After defining relapse as any condition, whether accompanied by pyrexia or not, necessitating stopping exercise and being put on "rest" for four days or more, the authors find that the longer such a relapse, the worse the ultimate prognosis, and the earlier it occurs after exercise has been started, the less likelihood of an eventual good result. On the other hand, a relapse occurring for the first time when the patient has reached a high grade of exercise is of little importance. They find that better results are obtained in those with a complete collapse than in those in whom partial collapse only has been obtained, but in the absence of details as to the degree of disease before induction, they deprecate the use of their figures as an argument in favour of dividing adhesions. Their views on the value of pneumothorax treatment in bilateral disease are in substantial agreement with those of Dr. BURRELL. They find that an irregular or a periodic temperature in men is an unfavourable indication. One of the great benefits of this form of treatment is the cessation of cough and sputum, or, if sputum persists, the disappearance from it of tubercle bacilli. Dr. WINGFIELD and Dr. WILSON'S figures show that when the bacilli persist in the sputum in spite of the treatment the outlook is very unfavourable. As with other modes of treatment gain in weight is a valuable index of the beneficial effect of this treatment. Early loss of weight is of grave import and should lead to a reconsideration of the treatment as a whole. A complication discussed in both papers is that of pleural effusion occurring in the course of artificial pneumothorax. Dr. WINGFIELD and Dr. WILSON maintain that where the effusion is clear and non-purulent it has no influence on the ultimate result, an opinion in which Dr. BURRELL concurs, except that he finds that in cases occurring in association with bilateral disease the outlook is less good and that there is a tendency for the effusion to become purulent. It is allowed in both papers that a purulent effusion is a grave occurrence. Perhaps the most striking result is that in Dr. WINGFIELD and Dr. WILSON'S cases, which were an unselected, consecutive series, including a proportion of the late stage or "last resort" types of case, no less than 49 per cent. were restored to working capacity. It is noteworthy that these results were obtained in a sanatorium, and it serves to emphasise Dr. BURRELL'S opinion to the effect that artificial pneumothorax is not to be regarded as a cure for pulmonary tuberculosis, but as a safe method of ensuring rest of the diseased part of the lung, to be used in conjunction with other methods of treatment. This seems to us to be the true perspective, and used with due discrimination the induction of artificial pneumothorax will give even better results than at present. It must be emphasised, however, that the selection of cases should be most carefully made, and here X ray examination is, we hold, indispensable.

[1] THE LANCET, 1922, ii., 286.

Annotations.

"Ne quid nimis."

THE ASSESSMENT OF FŒTAL AGE.

THE danger in medico-legal work of making dogmatic statements with regard to the age of a new- or still-born infant is exposed in the course of a critical study by Dr. J. N. Cruickshank and Dr. M. J. Miller[1] of the accuracy of the various accepted methods of estimating the age of the fœtus. The three methods commonly employed are: (1) Measurement of body-length and body-weight, (2) examination of the number and dimensions of the centres of ossification, and (3) estimation of the duration of gestation from the maternal menstrual history. In the series of 470 normal fœtuses examined, no one method or combination of methods of estimating fœtal age was found to be accurate in all cases, and the conclusion reached was that there can be no absolute certainty that the age of any individual fœtus has been correctly assessed. Attention is especially drawn to the extreme difficulty of estimating fœtal age during the eighth and ninth month. On the whole, body-length has been found more reliable than body-weight; this is of interest in view of the results of recent studies of postnatal development, in which the body-length has been found to be more reliable than body-weight as a guide to the progress of growth. The authors note that in the last three months of intra-uterine life the weight of the fœtus increases at a proportionately greater rate than that of any of the organs studied, except the spleen and thymus. It is during these months that most of the fat is laid on, and they suggest that this may explain the greater proportionate increase of the body-weight. They are cautious, however, in pointing out the limitations of the application of the results obtained from what they regard as too small a number of cases to allow more than tentative conclusions. It is curious that such a detailed and careful study of the normal fœtus has yielded so few positive results; the problem will probably have to be attacked from many different angles. We published last week an attempt on the part of Dr. Lucas Keene and Miss E. E. Hewer, D.Sc., to ascertain by combined chemical and histological methods the period at which the various organs begin to function in the fœtus. The work is suggestive, and may lead in the future to a further means of assessing the age of any individual fœtus.

DEVELOPMENT OF THE IRIS.

WE are all well acquainted with the outward appearance of the iris, for we see many scores of examples of its variations every day, but few who are not in the ranks of anatomists or embryologists know much about its intrinsic structure, or are deeply informed concerning its development. Among the numerous papers read at the summer meeting of the Anatomical Society, held at Sheffield on June 27th and 28th, was an interesting communication from Miss I. C. Mann, dealing with some points in the development of the human iris. There are several things in the normal course of formation of this structure which seem to call for future research. The strange provision of a mesodermal stratum, for example, along the inner aspect of which the ectodermal structures extend secondarily, may require investigation into the early stages of evolution of the eyeball to explain its presence and meaning. The pupillary membrane is merely the attenuated central portion of this stratum, and it is to be expected theoretically that a structure that disappears so late as this membrane would leave frequent traces of its former presence. It is probable that such traces are more common than is generally supposed. Certain observations with recent and greatly improved methods of illumination and examination do, in fact, suggest that this is so. The curious and interesting formation of muscle in the iris by direct growth from the margin of the advancing ectodermal or retinal layers was well seen in some of the older sections shown. This origin, which has been known for a number of years, is without parallel in the body, for such ectodermal development as that of the muscles of the hair bulbs, if it actually takes place, is hardly comparable with what is really direct formation from a part of the brain itself. Miss Mann concerns herself with the development of the eye with a view to the explanation of congenital defects of the organ, but it is to be hoped, for the sake of definite knowledge on human formation, that she will continue these observations and researches into the minutiæ of structure and development.

[1] Child Life Investigations. The Estimation of Fœtal Age, the Weight and Length of Normal Fœtus, and the Weight of Fœtal Organs. Medical Research Council. Special Report Series No. 86. H.M. Stationery Office. 1924. 2s. 6d.

HERPANGINA.

UNDER the name of "herpangina," Dr. John Zahorsky,[1] of St. Louis, describes a specific febrile disease characterised by the appearance of minute papules, vesicles, and ulcers in the throat. The disease occurs only in the summer months and affects children mainly between the ages of 3 and 10, though a few examples were seen in children between 12 and 15. The epidemic nature of the disease is shown by the affection occurring in groups. In family practice one child after another contracts the sore-throat. On bacteriological examination the same organisms are found as those which are usually present in ordinary sore-throat. The incubation period is from four to ten days. The disease begins with a sudden rise of temperature to 102°–105° F. Vomiting is very common, but not persistent. Headache and pains in the back of the neck are frequent. Nothing is seen on physical examination except the following characteristic appearances of the throat. There are minute vesicles from the size of a millet seed to that of a small pea on the anterior pillars or along the free margin of the soft palate, occasionally on the posterior part of the buccal mucosa or roof of the mouth, but much more frequently on the tonsils or pharyngeal mucous membrane. The vesicles rupture and leave punched-out ulcers, which become covered with a thin exudate. The lesions are never very numerous. In most cases the tonsils present a considerable inflammatory reaction. There is a slight leucocytosis. An irregular fever continues for two to four days, and then the temperature falls by lysis and the other symptoms subside. There are no complications or sequelæ.

THE RESCUE OF DRUG ADDICTS.

WE have just received a report of the Homes for Inebriates Association, together with the fortieth annual report of Dalrymple House, Rickmansworth. This house, licensed under the Inebriates Acts, 1879–99, was established in 1883 for the treatment of gentlemen suffering from alcoholism or drug-habit and desirous of cure, and is conducted by a committee elected by an association of prominent churchmen, medical men, Members of Parliament, and others interested in the temperance question. The house is not run for profit, any surplus revenue being spent on improvements for the benefit of the patients. During the past year, of the 72 patients admitted, 55 entered as private patients and 17 under the Acts; 67 of these desired treatment on account of alcoholic excess, and five for drug-habit. The average length of residence was about two and a quarter months, or three and a half months under certificate. The resident medical superintendent, Dr. F. S. D. Hogg, remarks on the need of amendment of the Inebriates Acts in order to allow of non-criminal inebriates being compulsorily placed under supervision and treatment. He continues to receive appeals for advice as to the

[1] Archives of Pediatrics, March, 1924.

possibility of such control, and has to admit that, apart from financial or domestic pressure, only persuasion is open to those interested in these victims. So long as they commit no offence against the law they are free to degrade and ruin themselves, their families, and dependents; only, as a rule, when resources are exhausted, positions lost, and constitutions ruined, do they consent to place themselves under treatment. Earlier control would, Dr. Hogg feels sure, result, in many cases, in the retention of position and fortune. An appendix to the report gives particulars of a cumulative group of 1645 patients consecutively discharged. The occupation of these, in order of frequency, is set down as none, merchants, medical practitioners, military officers, clerks, manufacturers, farmers (including market gardeners), solicitors and engineers (equal), distillers (including brewers), clerks in holy orders and civil servants (equal), schoolmasters (including tutors), barristers-at-law, stockbrokers, artists and the theatrical profession, journalists—no other occupational group numbering as many as 20. The kind of inebriant used was in a vast preponderance of cases spirits in some form or other, beer alone occurring only 44 times and wine alone 40 times out of the total of 1645. The after-history of the cases shows how well repaid is the time and trouble incurred, for Dr. Hogg is able to note that about 40 per cent. of the 1645 are doing well, and another 6 per cent. are improved. The terms for admission to Dalrymple House are £6 6s. a week for those who remain three months or longer. Somewhat higher fees are charged for shorter periods. For admission under the Acts the report reminds those interested that the patient must sign a request for admission, specifying a period not exceeding two years, in the presence of a stipendiary magistrate, or better (without publicity) before a justice of the peace. Two persons of either sex, relations being eligible, must also sign a statutory declaration before a justice or commissioner for oaths. There is no necessity for the three signatures to be made at the same time or place; one or all can be signed at Rickmansworth, if preferred. The report, of which we have summarised the main features, is a document of great human interest, based upon clinical material observed and recorded now over a long period of years. We hope that the time is coming when the Association will issue a considered statement of the methods and results of treatment of drug-addiction at Rickmansworth.

POST-GRADUATE WORK ON ALPINE CLIMATE.

THE Davos Medical Association announces a post-graduate course for medical men on tuberculosis and the alpine climate, to be held at the Davos Research Institute during the week August 17th–24th. The course, which is the second of its kind, will be given in both French and German, a detailed prospectus to be issued later. It is now a little over six months since the formal opening of the Institute in the presence of a number of distinguished climatologists, Prof. Loewy being in charge of the physiological department and Prof. Dorno in charge of the meteorological. A number of interesting studies have already originated from the Institute, including work on the volume of the blood at high altitudes, the cholesterin-content of the blood in tuberculous patients, and the mechanism of blood regeneration. A paper appeared recently [1] by Privatdozent P. György, of Heidelberg, on the acid-base balance at high altitudes. Dr. György comes to the conclusion that in patients at rest in Davos there is a lowering of acid excretion in the urine, that climbing gives rise to a perceptible, but not unduly high, increase in the acid-ions eliminated, and that respiratory tetany is more easily induced in the same individual at a height than in the lowland. It is Prof. Loewy's hope that this research institute, the first of its kind in the mountains, may prove of definite value to the practitioner. The question what factors in the alpine climate are responsible for its effects remains still unanswered, as well as the cognate question whether the effect of insolation is to be explained on a chemical or on a physical basis. A library has already been collected at the Institute and is in process of cataloguing and classification, and it is hoped that the third department of the Institute—namely, the bacteriological-pathological—may soon be opened. The Institute is happy in having obtained the reversion of the scientific apparatus no longer required at the observation station of Muottas-Muraigl, above Pontresina. Among those attending the course there may well be some who will be glad to avail themselves of the opportunity for research along new and fruitful channels.

[1] Schweizerische Medizinische Wochenschrift, 1924, p. 416.

MEDICAL WOMEN'S INTERNATIONAL ASSOCIATION.

THE Medical Women's International Association opened its third Conference in London last week under the presidency of Dr. Esther Lovejoy, of New York. Some 300 members registered their names for these meetings, including 75 representatives of countries overseas; among these were medical women practising in such diverse parts of the world as Constantinople, Uruguay, Australia, and Norway. The time of the delegates, representing some 10,000 medical women, was largely occupied with business, as this was the first meeting of the fully constituted representative council under the amended constitution. After a preliminary meeting held in New York in 1919, at which it was decided to form a world-wide association of medical women, the constitution was discussed and passed at the second meeting held in Geneva in 1922. At the present meeting the necessary by-laws have been added. The general meeting of the Association was held on Wednesday morning, when after the President-elect, Lady Barrett, had been inducted to the chair, representatives from 15 of the 17 countries sending delegates to the meeting told of the numbers, organisation, and work of the medical women in their respective lands. The speakers were: Dr. Grieg (Australia), Dr. Becher-Reidenhof (Austria), Dr. R. Leacock (Canada), Dr. Dewetterova (Czecho-Slovakia), Dr. Thuillier-Landry (France), Dr. Heusler Edenhuizen (Germany), Dr. M. Balfour, C.B.E. (India), Dr. Signe Swensson (Norway), Dr. Grace Stevenson (New Zealand), Dr. A. Ilnicka (Poland), Dr. V. Lebedeva (Russia), Dr. Marie Ugon (Uruguay, South America), Dr. Marie Feyler (Switzerland), Dr. Safieh Ali (Turkey), and Dr. Katherine Manion (U.S.A.). It was announced that Dr. Jane Walker had been appointed treasurer to the Association. On July 17th a discussion took place on maternal morbidity, which is reported on p. 185. The Hospitality Committee, under the presidency of Dr. Jane Walker and its hon. secretary, Dr. Kathleen Lander, had arranged an attractive programme of entertainments and expeditions for members of the Congress. The proceedings opened with a reception and conversazione at the Royal Society of Medicine on July 14th. On the 15th Miss Aldrich-Blake entertained a large party to luncheon at the London (R.F.H.) School of Medicine for Women. In the afternoon of the same day the members were welcomed by the Archbishop of Canterbury and Mrs. Davidson at Lambeth Palace, and in the evening receptions were held by Lady Sybil Smith and by Lady Barrett. On Wednesday a luncheon party, given by the London Association of the Medical Women's Federation at the Botanical Gardens, was followed by a visit to the Royal Free Hospital, and in the evening a large gathering assembled at 10, Downing-street, where the Prime Minister and Miss Ishbel MacDonald welcomed the visitors on behalf of the Government. On Thursday the various provincial associations entertained the foreign guests to luncheon, some of the delegates from the

dominions were present at THE LANCET luncheon to doctors from overseas dominions, and in the afternoon parties were invited to tea on the terrace of the House of Commons. In the evening the British Medical Women's Federation held its annual dinner at the Trocadero Restaurant, Piccadilly, for the success of which the admirable arrangements made by Lady Briscoe, M.B., were largely responsible. All overseas delegates were invited as guests and over 320 members and guests were present. The toast of "The Medical Women's International Association" was proposed by Prof. Graham Wallas and Mrs. Scharlieb, M.D., and responded to by Dr. Esther Lovejoy and Mme. Thuillier-Landry. "The Guests" was proposed by Dr. Jane Walker and replied to by Mrs. Fawcett, who was received with musical honours, and by Dr. Thelberg (U.S.A.). The proceedings concluded with "The Health of the Chairman," Lady Barrett, proposed by Dr. Walter Carr. On Friday morning the British members held their annual meeting, while a party of foreign delegates were shown over the museum of the Royal College of Surgeons of England by Sir Arthur Keith. Visits were paid to the Barbers' Hall and to the Apothecaries' Hall, and opportunity was provided for the foreign delegates to see the clinical work in various general and special hospitals and clinics. On July 19th a party of delegates was entertained at Bath, on the 20th at the East Anglian Sanatorium at Nayland, and on the 21st at Brighton.

RUPTURE OF THE SPLEEN FROM THERAPEUTIC MALARIA.

THERE is one aspect of the treatment of general paralysis of the insane by the artificial induction of malaria which has not yet received the attention it deserves. The subjects of general paralysis are often debilitated, feeble creatures, incapable of withstanding diseases which even the young and robust find most exhausting. In many countries in which malaria is endemic and syphilis is common, general paralysis is comparatively rare, and our knowledge of the action of one disease on the other is, therefore, very incomplete. We shall soon know more of this interaction, after more cases of general paralysis have been treated by the artificial induction of malaria. Together with encouraging results, a few disquieting accounts have been published of the effects of tertian malaria on the subjects of general paralysis. In *Le Scalpel* for May 10th Dr. M. Alexander records the case of a man, aged 50, admitted to hospital on Feb. 8th, 1924, suffering from general paralysis. For several months there had been progressive mental deterioration, with great irritability and incoherency. He looked much older than he was, he was easily fatigued, the tendon reflexes were exaggerated, and the skin reflexes diminished. The examination of the cerebro-spinal fluid confirmed the clinical diagnosis, and on April 9th he was given a subcutaneous injection of 5 c.cm. of blood from a patient suffering from tertian malaria. Ten days later a bout of fever developed, but it did not conform to type, a rise of temperature occurring every second day. The patient underwent with apparent impunity and ease eight attacks of fever, the temperature reaching 39° C. After the eighth attack he was seen to turn pale and to collapse on his bed, where he was found to be dead. The necropsy confirmed the diagnosis of general paralysis without, however, revealing any lesion of the brain. The kidneys were intact, whereas there was some cardio-arterial sclerosis. The abdominal cavity was full of blood derived from a soft spleen which had ruptured, the appearance of the spleen suggesting a veritable explosion within it. As long as such an incident is isolated it need not be regarded as more than a clinical curiosity. General paralysis of the insane is such a terrible disease that it is justifiable to take even great risks in the attempt to check its progress, but if the incident just described recurs frequently, it is conceivable that treatment with malaria may have to be confined to those cases of general paralysis in which there is a fair margin of general vitality and recuperative power. In Denmark advanced cases of general paralysis have been used as human thermostats in order to keep a strain of tertian malaria alive by frequent passage, and it will be interesting to learn what effect the malaria has had on these incurable cases.

MEDICAL STUDIES IN VIENNA.

ADVANCED English medical students have indicated a wish recently to continue their medical studies in the Medical Faculty of Vienna, and that faculty has now decided to allow such students to enter their schools, and further, will recognise in the case of the unqualified men the studies already attended in English medical schools. Similarly, there will be recognition of the examinations passed in England which correspond to the Austrian First Professional Examination—namely, physics, biology, chemistry, anatomy, histology, and physiology—but exemption will not be granted from the first Austrian examination unless a candidate has passed in all of these subjects in England, as they constitute one examination in Austria.

DECOMPOSITION OF URINE AND ITS PREVENTION.

IT is often desirable to collect the urine that is passed during the 24 hours in order that the analysis of such an abnormal constituent as sugar may give correct information as to the total daily output of sugar. To trust to a random sample of urine passed at any hour of the day is to court gross inaccuracy. But the collection of all the urine passed in the 24 hours does not get over this difficulty unless its decomposition is prevented by some means or other, for ammoniacal decomposition and changes in the sugar content of the urine are apt to stultify the results of an analysis. In a paper in *Norsk Magazin for Lægevidenskaben* for June, Dr. T. Brandt and Dr. R. C. Stokstad have published investigations throwing light on this problem and providing a simple solution to it. They have tested a variety of disinfectants and have found that many of the most common, such as formalin and carbolic acid, are unsuitable because of their capacity to reduce sugar. They have found toluol act satisfactorily, but not for longer than 24 hours. The same could be said of thymol. Xylol proved to be an unsatisfactory disinfectant, and so did chloroform, probably because it was too volatile for the purpose. Perchloride of mercury in a strength of 0·5 per 1000 prevented decomposition even for 48 hours, and toluol prevented decomposition for 24 hours, when 15 c.cm. were added to a litre and a half of urine and thoroughly shaken. The same effect could be obtained with 15 c.cm. of a 10 per cent. solution of thymol in alcohol. But most of these disinfectants possess certain disqualifications. Either they are too expensive for routine hospital work or they are (with the exception of perchloride of mercury) inadequately soluble in the urine, which has to be shaken vigorously to obtain the desired result. Another objection to toluol is its inflammable properties, and the greasy coating it leaves on the test-tube. In view of all this, the authors have abandoned the idea of preventing decomposition of urine with the help of disinfectants, and they have done so the more willingly as they have come to the conclusion that the problem is one of chemistry and physics as well as of bacteriology. For, as they point out, the rate of decomposition of various urines is far from uniform, even when the bacterial contamination is uniform. Their investigations have shown that the best solution to this problem is to be found in a study of the hydrogen-ion concentration of the urine, a sample with a pH under 5·0 showing practically no ammoniacal decomposition even after 24 hours in a thermostat. All that is therefore needed to prevent decomposition of urine is to render it highly acid,

and for this purpose the authors recommend the addition of about 15 c.cm. of HCl to every litre and a half of urine. Any other acid will serve the same purpose except nitric acid, which destroys various organic substances.

PSYCHOLOGICAL TESTS OF EDUCABLE CAPACITY.

THE report [1] of the Consultative Committee of the Board of Education on psychological tests of educable capacity and their possible use in the public system of education has just been issued. After an historical sketch of the development of the psychological tests, and a discussion on the merits and disadvantages of the various types of tests and their scope, the Committee proceeded to consider "intelligence" tests in connexion with ordinary examinations intended primarily to test ability. The possibility of such tests in schools of different types and of standardised scholastic, vocational, and physical tests, and tests of memory, perception, and so forth, affording subsidiary information is also considered. The provision of courses for teachers in experimental psychology and the question of taking steps to coördinate and organise research and to distribute information bearing on the application of psychological and statistical methods to education are also discussed. In summarising the conclusions arrived at, the Committee note a general agreement that tests of "intelligence" are of value as supplements to, but not as substitutes for, the present methods of estimating individual capacity. Group tests are recommended for children over 10 and for adults as easier to apply, mark, and interpret by teachers with but little psychological training; individual tests, which are more suitable for young children, require application by an expert. All tests need considerable discretion in their interpretation. As to the bearing of psychological tests on public examinations, it is regarded as probable that in time the whole theory and technique of ordinary examinations will be modified by the application of the principles adopted in constructing and standardising intelligence and scholastic tests. The need for study of the legitimate aims and inevitable limitations of viva voce examinations and their technique is brought to the attention of psychologists. In view of the desirability of coördinating research, it is suggested that the Board of Education, either acting independently or in association with other Government departments interested in psychological tests, should set up an advisory committee to work in union with university departments of psychology and other organisations.

THE house and library of the Royal Society of Medicine will be closed during the whole of August for cleaning and repairs.

Mr. David P. D. Wilkie, F.R.C.S., has been appointed by the Curators of the University of Edinburgh to the Chair of Surgery, which has been vacant since the retirement of the late Prof. Alexis Thomson last October. The appointment is for a definite period of ten years from next October. Mr. Wilkie is at present assistant surgeon in the Edinburgh Royal Infirmary, and is lecturer on clinical surgery in the University of Edinburgh.

[1] H.M. Stationery Office. 1924. 2s.

INDEX TO "THE LANCET," VOL. I., 1924.

THE Index and Title-page to Vol. I., 1924, which was completed with the issue of June 28th, will shortly be published. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2. Subscribers wishing to receive the Indexes regularly as published should indicate this desire.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

LXXXI.—ACUTE ANTERIOR POLIOMYELITIS.

IN the treatment of a disease an accurate conception of its pathology is an essential. The pathology of acute anterior poliomyelitis divides itself, when looked at from a therapeutic standpoint, into three stages. These may be labelled for convenience the stage of onset, the stage of destruction, and the stage of repair.

Stage of Onset.

The stage of onset is not always evident. When it occurs its symptoms are often vague. Fever, malaise, sore-throat, perhaps some slight gastro-intestinal disturbance are all accompaniments of the onset of many other commoner diseases. Not until the second stage, that accompanied by the development of a sudden paralysis, does the enemy reveal himself, and then at a time when his damage is already half done. But it is in the first stage of the illness that treatment may be really effective and when diagnosis should ideally be made; *in the presence of an epidemic* there are two phenomena that may lead to a correct diagnosis before the onset of paralysis. Pain in the limbs and spine, sometimes in the former case so severe as to suggest acute rheumatism, may precede the paralysis by 24 hours. A lymphocytosis in the cerebro-spinal fluid is found almost invariably during the first stage. Two therapeutic measures are of value at this period, serum given intrathecally and intravenously and large doses of urotropin administered by the mouth.

Serum Treatment.—The serum should be that of patients some weeks convalescent from the disease, but as the immunity conferred by attacks of filter-passing organisms is both great and prolonged it is probably that serum is still of protective value up to a period of five years. The blood (200 c.cm.) should be collected in a flask previously rinsed out with sterile normal saline solution. After the clot has separated firmly the serum (about 100 c.cm.) is drawn off and kept in a cool place. It is administered both intrathecally and intravenously on two successive days, about 25 c.cm. being given by both routes on each day. Malaria and syphilis must, of course, be excluded in the donor. S. Flexner and P. A. Lewis showed that, whereas intracerebral inoculation of the virus into monkeys invariably produced the disease, yet if human serum derived from convalescent children were given to the animals intrathecally paralysis in some cases was delayed and in others completely prevented. In the case of an epidemic such convalescent serum may well be procurable, but otherwise horse serum can be given. There is some evidence that this also contains antibodies against the virus. Whichever is used the administration is of greatest value in the first or pre-paralytic stage, but *is probably still of some value for the first two or three days after paralysis has appeared.* If horse serum is used it may be necessary to desensitise the child against the occurrence of anaphylaxis by successive half-hourly doses of ℥i., ½ c.cm., 5 c.cm., before giving the full intravenous and intrathecal doses.

Urotropin.—As for convalescent serum, so for urotropin, there is experimental evidence of its probable value in acute poliomyelitis. S. Flexner and Clark have shown that if large doses of the drug are administered to monkeys an appreciable amount is soon to be detected in the cerebro-spinal fluid; and, furthermore, that if the monkeys are during this time inoculated with the virus of acute poliomyelitis paralysis can be delayed and even in some cases prevented. There is no doubt that to obtain a therapeutic effect large doses should be given,

the drug being pushed boldly for a short period. G. F. Still quotes the case of a child, 21 months old, to whom 10 gr. were given every two hours for 24 doses. These heavy doses are the more allowable in that the period during which active damage to the central nervous system occurs is a short one, and it is during that time, amounting to three or four days in all, that the action of the urotropin in the theca is desired. The organ most likely to be damaged in any way by the urotropin is the kidney, and careful daily urinary examinations for albumin and blood should be made as a routine. Urotropin may also wisely be given for a week to children who have come into contact with cases of the disease as a prophylactic measure.

Stage of Destruction.

This stage lasts probably for five or six days. During that time the damage to the nerve tissues is done. This damage is to be divided into two categories, permanent and temporary. Some of the anterior horn cells are so severely hit that recovery can never occur, others are only partially poisoned or mechanically interfered with by their proximity to the areas of attack and the resulting local inflammatory changes. Furthermore, it must be remembered that hyperæmia is found post mortem in parts of the central nervous system far from the paralysed areas. It is with a view to resting these insulted rather than wounded tissues that treatment is designed at this period. The patient is kept at rest in a quiet, airy room, bright light is excluded, and visitors are not allowed for the first week. Bromides and even chloral can reasonably be given to shield the nervous system from all excessive stimuli. As mentioned above, serum and urotropin should be given for the first 48 hours of paralysis.

Stage of Repair.

The stage of repair may last for two years, and it thus comprises the large majority of cases of infantile paralysis met with in practice. Its successful treatment is a lengthy, often a tedious, business. But this conception—one of almost invisibly slow but steady progress—is one to be held by the medical attendant and to be explained carefully to the parents of the patient. Treatment of the disease is thus a campaign rather than a battle, and for its success considerable attention to detail is necessary. Since the essential pathological lesion involves the anterior horn cells it is obvious that the peripheral manifestations will be motor and trophic. The trophic lesion results in peripheral vasodilation and loss of heat, and must be compensated for, in the case of the legs, by the wearing of long woollen stockings. If these are insufficient further coverings, possibly quilted, must be made and worn; paralysed arms are similarly treated.

It is, however, the damage to the motor mechanism that demands the greatest assiduity and care in treatment. The treatment consists of (*a*) immobilisation, (*b*) massage, (*c*) passive and active movements, (*d*) repair operations. As soon as the diagnosis is sure an exact investigation must be made as to which muscles are paralysed. This can be done by stimulating their movements and by carefully watching, or more accurately by noting their electrical reactions. The limb should then be immobilised without delay in such a position that the paralysed muscles are relaxed and their antagonists slightly on stretch. There is nothing so fatal to the complete recovery of a paralysed muscle as tension. On the other hand, tension of the sound muscles causes a reflex relaxation on the part of the antagonistic unsound muscles. The exact form of immobilisation does not greatly matter, but two points should be kept in mind; the support should be light and should be easily removable to permit of daily massage. The best material is celluloid.

Massage.—The most valuable ally in the campaign waged for the recovery of the limb from paralysis is the mother. She should understand that the task will last for two years, and she should, if a trained nurse is not permanently available, be taught to massage her child. During the first month or two she should watch the process and should learn how to carry it out herself. Ultimately there is no reason why she should not shoulder the whole burden herself. The instructions given her should be specific. Those in use at the Hospital for Sick Children, Great Ormond-street, are comprehensive and valuable; they are as follows:—

Rubbing.—This must be done for a quarter of an hour twice a day. Lay the child on a bed.

1. Rub the paralysed leg from the foot right up to the top of the thigh. Rub upwards only. Put the broad part of your hand on the back of the child's leg. In rubbing the thigh put your hand first on the back of the thigh and afterwards on the front, but always rub upwards and be sure to go as high as the loins. Whilst rubbing with your right hand hold the foot with your left. Use for rubbing any kind of oil.

2. Take hold of the child's leg with your two hands just above the ankle. Rub round the leg with your two hands in opposite directions, as though you were wringing out sheets. Work up the leg and thigh from the foot up to the top of the thigh in the above manner.

3. Take the child's calf with your two hands. Put your fingers to the back part of the leg and your thumbs to the front. Squeeze the soft parts out between your finger and thumbs so as to flatten the leg out and make it as wide as possible. Work right up the leg and thigh in this manner.

4. Put your right hand over the front of the knee and your left under the foot. Push up the foot and, holding your right hand in front of the knee, you will prevent yourself doing any harm. You want, if possible, by pushing the foot to make the child push against your left hand with all its might. This is the most important of all exercises.

5. Flip every part of the leg and thigh with your fingers so as to make the whole of the limb quite red and warm.

6. Gently rub up and down all over. This will take away the stinging which was left by the last movement.

Passive Movements.—At the end of the day's massage the joints of the affected limb should be moved passively in all their normal directions, especially in the direction towards which they would be drawn by the paralysed muscles.

Active Movements.—The child should be encouraged to try to move the paralysed limb and the slightest twitch of an affected muscle should be drawn attention to and praised. It will sometimes be found that such movements will first be noticed in a warm bath, and this fact should be remembered and impressed upon the mother.

Repair Operations.—The advances made in orthopædic surgery make it probable in the majority of cases that further functional improvement can be obtained after all active repair has ceased, either by tendon transplantation or by joint fixation or by some other mechanical shift. Since, however, repair may progress for two years it is wise to postpone operative treatment until it is certain to what extent such a measure is necessary.

GEOFFREY BOURNE, M.D., M.R.C.P. Lond.,
Chief Assistant, St. Bartholomew's Hospital; Physician, East London Hospital for Children, Shadwell.

QUEEN ALEXANDRA SANATORIUM FUND.—The annual report for 1923–24 shows that 28 grants were made to 14 men and 14 women, who were thus enabled to take a prolonged cure in the Alps during the past winter season. The average stay amounted to 158 days, and the winter was a fine one, offering the best possible conditions for successful treatment. The average cost to the Fund of each patient has been about £15 10*s*., or at the rate of 6*s*. 8½*d*. per day, the total cost per patient per day for maintenance and treatment being approximately Fr.16. The patients have, therefore, paid just under 50 per cent. of the cost of their treatment. Of immediate results, 22 gained in weight, in 9 the disease was arrested, and 7 others were improved; 3 cases were treated with tuberculin injections, 2 with vaccine injections, and 4 with antiseptic inhalations. It has been decided to make a limited number of grants during the present summer. The sanatorium at Davos was only reopened on Oct. 15th, 1923, but experience is already sufficient to show an extensive demand for a scheme of assistance on the lines of the Fund.

Special Articles.

MEDICAL WOMEN'S INTERNATIONAL ASSOCIATION.

MATERNAL MORBIDITY: ITS CAUSES AND PREVENTION.

AT the scientific session of this Association, held on July 17th, the Chairman, Lady Barrett, President of the Association and of the British Medical Women's Federation, in an opening paper, pointed out that the causes of maternal morbidity are, in effect, the same as those that account for our maternal mortality—viz., sepsis, hæmorrhages, toxæmias of pregnancy, difficulties in labour, and complicating diseases, such as heart disease. The general health of the woman protects her to a very large extent against almost all these dangers; it guards her from the toxæmias, affects the activity of the uterus in labour, contributes to the endurance of the patient in the event of long or difficult labour, and provides the necessary resistance to the invasion of organisms.

The Problem as one of General Health.

The problem of maternal morbidity was, therefore, the problem of the woman who is not in perfect health, and the line of attack must be that of general health and conditions of living. All working for the improvement of motherhood—doctors, nurses, midwives, health visitors, and administrators—were, said the speaker, engaged primarily in the process of observation, noting when and where and how the health of the expectant mother deviates from the line of normality, and in this respect the doctors, nurses, and administrators were dependent to a very large extent on the health visitor, who has greater leisure for such observations. In theory we knew enough to reduce the present maternal mortality and its dependent maternal morbidity by one half, as had, indeed, been done in certain areas of the country. Our task was to see that this knowledge was put into practice in every county and district of the land.

Dame Janet Campbell gave an account of the methods and mechanism employed by the Ministry of Health and local authorities in this country for the assistance of mothers and infants. She pointed out that, while the infant mortality-rate had been very considerably reduced during the last 20 years, the maternal mortality-rate (1 in 250) had remained almost unaltered, although the introduction of the Midwives Act seemed to have reduced the puerperal sepsis rate to some extent.

Dr. Margaret Balfour, representing India, told the Conference of the conditions there. The local midwives, though ignorant of modern methods of asepsis, were capable of dealing with ordinary cases, though their ineradicable habit of unnecessary interference rendered them a source of danger; but in all abnormal cases the rate of mortality reached an enormously high figure. In Bengal, where the majority of the primiparæ were under 13 years of age, over 16,000 girls died in childbirth in 1921. In the Punjab a medical woman had recently been appointed to assist the Director of Public Health, but very much more in this direction yet remained to be done.

Value of Lactation.—Importance of Diet.

Dr. Helen Boyle (Brighton) spoke of the nervous and mental aspects of the subject and stressed the extreme rarity of puerperal insanity in mothers who nursed their babies. There was far too great a tendency to take the baby off the breast at the slightest sign of nervous symptoms, and to overlook the fact that lactation is not only a secretion for the benefit of the infant, but also an excretion for the benefit of the mother. She concluded with a plea for the observation and early treatment in every case of early nervous developments after childbirth.

Dr. Effa Davis (Chicago) said that as a result of her 30 years' experience of maternity work in the United States, she had come to the conclusion that much might be done to improve the conditions of labour in healthy women. For instance, there was the type that ate too much and exercised too little; they had too big children. By careful regulation of the regimen of the pregnancy period it was always possible to reduce the size of the child and thus reduce the difficulties of parturition. Dr. Davis spoke with admiration of the School of Domestic Science at King's College for Women, Campden Hill, and hoped for the wide extension of such work until every woman was taught, from childhood upwards, how to look after herself and her home in the best possible way. Two practical prophylactic points which Dr. Davis had found useful against sepsis were the employment of oakum instead of cotton for pads, thus introducing a mildly antiseptic atmosphere; and the custom of allowing all normal cases to rise from bed for the evacuation of the bladder and bowel, thus allowing the force of gravity to play its part in the drainage of the uterus.

The Blood Pressure Factor in Eclampsia.

Frau Dr. Heusler Edenhuizen (Berlin) spoke of some investigations bearing on the prophylaxis of eclampsia. It was found in Germany during the years 1918–20, when there was an average loss in weight among women of 17 kilos each, that there was a striking decrease in the incidence of eclampsia, although all parturient women were in a state of very great exhaustion. These women were found to have a blood pressure as low as 116 mm. and this appeared to be the significant factor. Dr. Edenhuizen had found that of all methods tried for reducing the blood pressure twilight sleep was the most valuable, reducing the pressure sometimes from 180 mm. to 130 mm. in two hours. She went on to speak of puerperal sepsis, and stated that she had found, without exception, that where sepsis occurred, in spite of the most rigid antiseptic measures, there had been coitus within a few weeks of labour. Among the peasants of the Rhine valley there was a superstition that coitus during the first pains renders labour easier; sepsis was there very prevalent and no antiseptic measures seemed able to counteract it. Among the educated classes of Berlin Dr. Edenhuizen had been able greatly to reduce the incidence of sepsis by forbidding intercourse after the fifth month.

Dr. Sylvia Chapman (New Zealand) told of the "Safe Maternity Campaign" which had recently taken place there. In the last five years 755 lives had been lost through puerperal deaths among a population of 1,000,000, and this was attributed to two causes—viz., the lack of proper antenatal supervision and the existence of private maternity hospitals run by midwives not fully competent for the work. A few antenatal clinics had recently been started in connexion with the St. Helen's Hospitals (the Government maternity hospitals), but they were as yet poorly attended, and there is need of education among women as to the importance of the antenatal period.

Frequency of Gonococcal Infections.

Miss Frances Ivens (Liverpool) emphasised the great importance of antenatal care, and the significance of the gonococcus, often latent or unrecognised, in the production of puerperal sepsis. She urged a more careful inquiry into the history of the patient, both maternal and general, and into the nature of any discharge; and made a plea for more and better equipped maternity beds, and better teaching of medical students in this subject.

Dr. Alina Ilnicka (Warsaw) read a paper on the morbidity amongst working mothers, which was greater than that amongst women who do not work at any trade or profession, showing that there must be something wrong in the woman worker's way of living. Such occupations as sewing machine pedalling, ironing, factory work requiring continuous treadling

and other forms of work acting as a vibratory massage of the uterus, left their mark in such disabilities as dysmenorrhœa, difficult healing of pelvic wounds, and a high percentage of abortions. Dr. Ilnicka urged more careful factory inspection, with these points in view, closer cöoperation between doctor, masters, and operatives, and selection among the workers, so that the woman was put in a position to produce the maximum of work with the minimum of fatigue. Not only was the manual worker badly situated, but the professional woman also, who, in Poland at any rate, did her six or eight hours work of teaching, clerking, or what not, and then returned to do all the duties of the home, very few being able to afford a maid. In Poland women were given eight weeks' leave before and six weeks after childbirth, and there was a possibility of the latter being increased to 12 weeks. The infant mortality-rate was 39 per cent. lower in cases where the mother remained away from work three months or more, than in cases where the baby was put on the bottle at the end of a month.

Dr. Becher-Reidenhof (Vienna) spoke of tuberculosis during pregnancy, and stated that the presence of the bacilli was not in itself dangerous, but that serious symptoms, such as high temperature and hæmoptysis, were doubly grave at such a time. The prognosis in the event of induction depended on the degree of infection and the duration of pregnancy, the outlook being most hopeful the earlier the uterus was emptied.

Dr. Kate Mead (Middleton, U.S.A.) spoke of the administrative methods in use in the U.S.A. since the introduction, two years ago, of the Bill allotting to each State a sum of money, to be doubled by the State, for the care of pregnant women. In her town there were nine visiting nurses among the 25,000 inhabitants, and they went to the houses of rich and poor alike, while every woman, no matter what her means might be, expected to go to the State hospital for her delivery. The midwives were not very good, and Dr. Mead urged more careful teaching of nurses in regard to asepsis, and suggested that sterile gloves should be worn for all services such as handling of bed-pans and bed-trays.

Dr. Rosamund Leacock (Canada) dealt with the bacteriological aspect of puerperal sepsis, after outlining the conditions of maternity work in Canada, where there were practically no midwives, only a few women who were allowed to manage cases living more than 30 miles from a doctor. She divided the causes of sepsis into extrinsic and intrinsic. Under the former heading she urged inquiries into any condition of slight sepsis in members of the household, since the streptococcus that is relatively unimportant in the ear or antrum of a relative might be fatal if it found its way into the uterus of the lying-in woman. Under the intrinsic causes she pointed out how a streptococcus could live for years in the Fallopian tubes, and said that no pregnancy should be allowed for at least two years after any pelvic infection.

Maternity Work in Russia.

Dr. V. Lebedeva (Director of the National Department for the Protection of Maternity and Child Welfare in Soviet Russia) presented a paper on the work being done there. She said that first of all her countrymen regard motherhood as a social function and mothers' and infants' welfare as a task of the State, and secondly, that the woman was always regarded as a force in the process of work. Thus the creche occupied a far more important place in Russian maternity work than in other countries. The legally-secured leave-period for Russian mothers was four months for manual workers and three months for intellectual workers. The institutions in force in the large centres include consultation clinics for infants, toddlers, and pregnant women, tuberculosis and venereal disease dispensaries, feeding centres and milk canteens, and offices for legal consultation and educational patronage. Allowances were granted through insurance offices for the time of pregnancy and lactation and for the necessary accouchement outfit. On Jan. 1st, 1924, there were in Russia 548 creches, 185 children's clinics, 44 mothers' clinics, 107 homes for mother and child, 401 homes for children, and 35 maternity homes. In Moscow a scientific institute of mothers' and infants' welfare had been established to deal with the physiology and pathology, prophylaxis and therapeusis of the mother and child, together with the teaching of physicians, pediatrists, midwives, and nurses. Here 197 doctors and 434 nurses and midwives were working.

Dr. Safieh Ali (Constantinople) said that the maternal morbidity in Turkey was chiefly due to sepsis resulting from lack of adequate nourishment during pregnancy and care during the puerperium. The women were well taken care of during labour, and the midwives' school, opened in 1847, was an excellent one. The first maternity hospital was opened in Stamboul in 1892, and there now existed Red Crescent antenatal polyclinics where expectant mothers were examined and supplied with food where necessary.

Mme. J. Réquin (Paris) divided the causes of maternal morbidity into medico-surgical and social, and gave statistics showing the relative proportion of deaths due to the various causes. She described the preventive work done in France, where there are free antenatal clinics in connexion with a hospital, a laboratory, a venereal disease and a tuberculosis dispensary. She urged the need for coöperation between doctor, midwife, and health visitor in educating women as to the importance of antenatal care. For those women who are delivered at home certain institutions provided advice on hygiene and lent materials for the accouchement, but there was need for more maternity hospitals, and for increased facilities of transport in country districts. The social causes of morbidity Mme. Réquin described as fatigue, unhappiness, and prejudice—i.e., against the unmarried mother, and against lack of luxuries and comfort which leads an increasing number of pregnant women to procure abortion.

Dr. Signe Swensson (Norway) spoke of the importance of diet in the pregnant period, and the greater part of her paper was occupied with the question of the vitamin-content in the artificially-prepared foods of the present day.

Papers by Dr. Hamilton, from the International Committee of the Association of Women in Public Health; by Dr. Wanda Szczawinska, of Warsaw; by Dr. Daisy Robinson (U.S.A.) on the public health and venereal disease aspect of the subject; and by Dr. Sarah Buckley, of Chicago, were also communicated.

CONGRESS OF THE ROYAL SANITARY INSTITUTE.

THE thirty-fifth annual Congress of the Royal Sanitary Institute, held last week at Liverpool, was well attended by some 1250 delegates, many of them from overseas. The delegates included representatives of the medical, engineering, and architectural professions, and many members of health authorities in all parts of the kingdom.

The Inaugural Address.

Lord Salisbury, the President of the Congress, delivered an inaugural address to a large audience in St. George's Hall on the evening of July 14th. He showed that the remarkable progress made in public health matters during the 70 years since Disraeli enunciated his famous aphorism "Sanitas sanitatum, omnia Sanitas," gave no justification for pessimism. Nevertheless, much remained to be done. The back of the housing problem was not yet broken. The corporation of Liverpool had done a great deal. They owed much also to the authors of the Garden City movement. The essentials of a healthy house

ought not to be costly. The provision of baths should depend upon the public opinion of the locality. Parlours, too, were rather amenities than essentials, and should only be provided if the occupiers were prepared to pay the extra rent involved. He concluded his address with a note of warning that the pursuit of sanitation and sanitary comforts was not a sufficient aim in itself, and could only be safely practised by a nation which realised that these things, important as they are, are only valuable according as they bring up a race which, governed by the spiritual idea of service, becomes more capable of effort and more equal to the achievement of the work which its world-wide responsibilities demand.

The Health Exhibition.—On July 14th also the Health Exhibition was opened by the Lord Mayor of Liverpool, supported by the mayors of neighbouring boroughs. The exhibition was well arranged in a building well adapted for the purpose, but situated rather far from the general meeting place and the attendance at the exhibition suffered from this fact.

The Sections.

The business of the Congress was conducted at five sessions: (A) Sanitary Science; (B) Engineering and Architecture; (C) Maternity and Child Welfare, including School Hygiene; (D) Personal and Domestic Hygiene; and (E) Industrial Hygiene. There were also seven conferences—namely, of representatives of sanitary authorities, of representatives of port sanitary authorities, of medical officers of health, of engineers and surveyors to sanitary authorities, of veterinary inspectors, of sanitary inspectors, and of health visitors.

Sir William Leishman, in his presidential address to Section A, made a strong plea for closer collaboration between the hygienist and the pathologist. His communication was followed by a discussion on the uses which might be made of the Schick test and immunisation for diphtheria, a valuable paper contributed by Dr. R. A. O'Brien being debated by Dr. H. P. Newsholme and Dr. E. H. R. Harries. The general opinion appeared to be that the staff of fever hospitals ought to be protected by immunisation, and that the method might be usefully adopted for the control of diphtheria in residential and other schools. Several speakers from U.S.A., including Prof. Welsh from Johns Hopkins University, took part in the discussion and showed that immunisation is being practised on a much larger scale in America. It was suggested that in some parts of America the disease is much more fatal than in this country, that the American population is much more ready to submit itself to measures of this kind, and that experience in this country with regard to vaccination does not hold out much prospect of the successful immunisation of the whole population against diphtheria.

The question of education in hygiene and propaganda with regard to V.D. gave rise to an animated discussion in Section A, opened by Dr. I. Feldman and Dr. Winifred Piggott.

The proceedings of the Section of Industrial Hygiene were opened by a valuable address from Dr. T. M. Legge, Senior Medical Inspector of Factories, which was followed by a suggestive paper delivered by Lieut.-Col. F. E. Fremantle, M.P., which we publish in abridged form on p. 200 of this issue of THE LANCET. Both papers showed how little progress has been made with regard to industrial hygiene in this country.

On Thursday, July 17th, there was a crowded gathering at the meeting of Section C on Maternity and Child Welfare to hear the discussion on antenatal clinics. The subject was ably opened by Dr. F. Cook, who was followed by Prof. Louise McIlroy. Unfortunately, the discussion was to be succeeded on the same morning by a discussion on the system of charging for the medical services provided for the maternity and child welfare centres and in the schools. The result was that in the first discussion the speakers were much hurried and there was little opportunity for general discussion. At the meeting of the port sanitary authorities the question of the sanitation of the mercantile marine was dealt with by Dr. W. Hanna and Dr. J. Howard Jones. In the course of the discussion it was shown that the arrangements for the crews leave much to be desired. It was stated that some shipowners were reverting to the old bad type of crews' quarters in the forecastle usual before the war.

Meat Inspection.

The question of meat inspection was discussed by the veterinary inspectors. Mr. H. L. Torrance showed that the illicit dealing in diseased meat carried on in the underworld of the meat trade was very much greater than was generally known and the inference was that it must be very profitable. A resolution was passed expressing the view that public abattoirs should be substituted for private slaughter-houses, so that all animals intended for human food could be submitted to both ante-mortem and post-mortem examination.

At the conference of medical officers of health on the last day Prof. W. S. Lazarus-Barlow put forward a large scheme for dealing with cancer. The scheme included arrangements for following up cases after operation and for the provision of centres for radium and X ray treatment for the whole country. He estimated that for a population of 42 millions £340,000 worth of radium should be available and might be allocated to seven centres, and that 14 fully equipped X ray centres would be required. It would also be necessary to have some State-aid for bringing the patients to, and treating them at, the centres. He suggested coöperation between the voluntary hospitals and Poor-law infirmaries to provide the necessary accommodation, and further stated that, on his advice, a scheme on these lines had already been started in one of the great dominions overseas. The mother country, therefore, should not lag behind.

The general arrangements for the Congress were, on the whole, very good.

THE LANCET LUNCHEON TO OVERSEAS MEDICAL REPRESENTATIVES.

ON Thursday, July 17th, in the Oak Room of the Hotel Victoria, London, a luncheon was given by THE LANCET to the Overseas Medical Representatives now on a visit to this country in connexion with the British Empire Exhibition. Some sixty guests accepted the invitation.

After the loyal toasts had been duly honoured, Sir Ernest Hodder-Williams, C.V.O., the Chairman of THE LANCET, who presided, welcomed the guests. He said that though on occasion he had been compelled to take unpleasant prescriptions from doctors he was not on this occasion going to get some of his own back on doctors by making a long speech to them. THE LANCET was delighted to show their welcome to the overseas members of the medical profession, and he and the staff were glad to have the honour of making personal acquaintance with a large group. THE LANCET had recently celebrated its centenary, and in the hundred years which had thus been commemorated there was nothing more remarkable than the way in which there had come into being a real unity of work and purpose in medicine among the English-speaking peoples, a constant interchange of views and works to the immense benefit of medicine and of mankind. The overseas dominions had given to the old country of their very best, while we on our part had certainly reciprocated. British medicine recognises no sundering seas. Science has no nationality; knowledge, as Pasteur said, "is the patrimony of humanity, though

at the same time, it should be the highest personification of nationality. Let us strive then in the pacific field of science for the pre-eminence of our several countries." The record of these strivings, of success, and of failure which is so often the precursor of success, is to be found in the pages of the paper which he represented, and more and more space will be devoted in the years to come to the record of the attainments of our overseas visitors.

Sir Squire Sprigge, the Editor, who endorsed the Chairman's words of welcome, regretted that duty had prevented the gathering from being larger, so many who had responded to the call of Imperial celebration by presence in the mother country having had to return home; but even in these circumstances the quality of the response to the invitation was significant. As an example of the spread of medical knowledge and increased facilities of inter-communication, he pointed out that in a copy of THE LANCET dated a little more than 100 years ago he found the first foreign communication: it was about half a column in length and had taken seven days to travel about 240 miles. Its appearance was considered by the editorial staff of that day to be a great event, for it was referred to at the beginning and in the middle of the paper and again commented upon in the following week. That was foreign correspondence in 1824. And now the publication of foreign correspondence from almost every part of the globe was a weekly incident. Although such effort was common to any newspaper which attempted in the smallest way to mirror the modern interchange of scientific thought, it could not be done if it were not for the extraordinary goodwill of the people at the peripheral centres towards the people at the old centre. Just as we send our best to the overseas centres, so they on their part send their best to us, and only from that kind of coöperation could such papers as the *Journal of the American Medical Association*, the *British Medical Journal*, or THE LANCET be produced.

In reply, Dr. L. M. McKillop expressed on behalf of the guests his extreme pleasure at the way in which they had been honoured. They had come many miles on a journey that had sometimes been wearisome, but among the many compensations they had received none had given more pleasure than the magnificent luncheon which THE LANCET had provided, an evidence of kind thought for which they would ever feel indebted. THE LANCET had fostered the feelings of good fellowship among members of the medical profession for over 100 years.

Dr. Edward H. Fyffe, who also responded on behalf of the guests, confirmed the sentiments of the previous speaker and said that the overseas visitors would go back to their homes with very kindly feelings for the way they had been received in the mother country.

The Hon. P. C. Larkin, High Commissioner for Canada, having proposed a vote of thanks to the Chairman, who briefly responded, the gathering broke up with many expressions between the guests of the goodwill and fellowship which medical science has engendered among its votaries.

Among those present were:—

Dr. Margaret Balfour, Dr. A. M. Begg, Sir John Rose Bradford, Dr. A. J. Spiller Brandon, Dr. Caroline S. Brown, Sir Bruce Bruce-Porter, Dr. Harry Campbell, Dr. A. J. P. Chapman, Dr. N. H. Club-Wala, Dr. J. J. Costello, Dr. Mary Crawfurd, Lord Dawson of Penn, Dr. R. W. Edgar, Mr. D. Eley, Dr. W. W. Fairfax, Dr. E. Gordon Fleming, Dr. Edward H. Fyffe, Dr. F. le M. Grasset, Sir William Hale-White, Dr. F. D. Hayman, Dr. A. T. Hobbs, Sir Ernest Hodder-Williams, Mr. Ralph Hodder-Williams, Dr. M. W. Kaplan, Mr. J. H. Kelly, Dr. Marguerite Kettle, Dr. C. A. King, Dr. J. H. W. Laing, Hon. P. C. Larkin, Dr. Joseph McAndrew, Dr. L. M. McKillop, Dr. P. McRitchie, Dr. R. H. Marten, Dr. J. L. Meagher, Dr. L. J. Middleton, Dr. M. Minde, Dr. G. H. Morrison, Sir George Newman, Dr. J. A. Nolan, Dr. W. Paisley, Dr. Henry S. Phillips, Dr. Isabella Phillips, Dr. Kate Platt, Dr. M. P. Reddington, Dr. Irvine K. Reid, Dr. G. W. Richardson, Dr. J. I. Rowan, Mr. E. M. Ryder, Mr. R. E. Sare, Dr. Barnet Solomons, Dr. V. E. Sorapure, Sir Squire Sprigge, Dr. H. Lawrence Stokes, Dr. Charles Sutherland, Dr. J. T. Tait, Captain Oscar V. Viney, and Mr. A. E. Mortimer Woolf.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING AT BRADFORD.

THE ninety-second annual meeting of the British Medical Association opened at Bradford on Friday, July 18th, when the Representative Body met at 10 A.M. in the examination hall of the Technical College to consider the medico-political questions of the year. Dr. R. WALLACE HENRY occupied the chair for the last time.

Municipal Welcome.

Early in the session the Lord Mayor of Bradford, Alderman H. M. TROTTER, accompanied by the town clerk, Mr. N. L. FLEMING, paid a visit to the meeting in order to welcome the Association on its first visit to Bradford. They were introduced by Mr. J. BASIL HALL, M.Ch. Camb., President-Elect, who acknowledged the kindness and consideration of the civic officials at every stage in the preparations for the meeting; a real spirit of hospitality, he said, had pervaded the whole community. Alderman Trotter invited the Association to inspect the municipal undertakings—hospital and clinics—of which Bradford was justly proud, and spoke of the urgent need for more medical men in the civic councils of the country. Dr. HENRY replied that the Association would examine with peculiar pleasure the municipal experiments in medical administration which had been so highly lauded and so severely criticised. The hon. local general secretary, Dr. W. N. WEST WATSON, also welcomed the Association.

REPRESENTATIVE MEETING.

FRIDAY, JULY 18TH.

After some formal business and the reading of apologies of absence, Lieut.-Col. F. O'KINEALY, I.M.S., was elected to represent the Indian Medical Service on the B.M.A. Council for 1924–27. Dr. G. E. HASLIP, retiring on account of ill-health from the office of treasurer to the Association (1916–24), was elected a vice-president. Later on in the session Mr. N. BISHOP HARMAN was elected treasurer in his place. Dr. F. G. THOMSON, of Bath, was elected President of the Association for the year 1925-26, and the annual meeting of 1926 was fixed for Nottingham. Speaking to the financial sections of the report, Dr. R. A. BOLAM, acting treasurer, gave an account of the Association's new house which it was proposed to enter without ceremony in March, 1925, the formal opening to take place a few days before the annual meeting at Bath later in the year. While a few minds were still hesitant about the financial commitment, the majority were evidently proud of the possession of a building with a noble hall and adequate space for all the activities of the Association. The notable services of Dr. Bolam as chairman of the B.M.A. Council in securing the new building were warmly acknowledged, as also those of Mr. L. FERRIS-SCOTT, F.C.A., the financial secretary.

MEDICO-POLITICAL MATTERS.

Mr. E. B. TURNER, chairman of the Medico-Political and Parliamentary Committee, moving the adoption of this section of the report, spoke of the lapse of the Dangerous Drugs Regulations in so far as they were irksome or deleterious to medical practitioners. The fees offered for medical examination of recruits (Navy 4*s.* per head, Air Force and Army 2*s.* 6*d.* per head) were totally inadequate, and opinion to that effect had been conveyed to the authorities. The fees paid to Admiralty surgeons and agents had been reduced in November last (consultation at surgery from 3*s.* 6*d.* to 3*s.* 3*d.*) and protest had proved unavailing. Fees paid to civilian medical practitioners for attendance on soldiers on furlough had undergone similar reduction; in the opinion of the Army Council protest would be unavailing so long as there is no disposition shown by members of the profession to decline to do the work at current rates. On the other hand, the

concessions made by the Home Office, in a circular to chief constables, in regard to fees to doctors called to street emergencies were of a more satisfactory character. Salaries of Home Office medical officers compared very unfavourably with those of the Ministry of Health, and it was the policy of the Association to get all this medical work as well as that of the Board of Education transferred, as had been foreshadowed when the Ministry of Health was instituted to this department.

Referring to the approaching election by the Representative Body of direct representatives to the General Medical Council, Mr. Turner regarded the constituency as not large enough for a useful "P.R." vote. Put to the meeting it was decided to elect the four representatives by the block or "first past the post" system.

Use of Opium by Midwives.

On a motion by Croydon, protest was raised once again against the use of opium by midwives. Mr. TURNER pointed out that three times the protest had been met by the Central Midwives Board with a blank refusal, although the use of pituitrin by midwives had been prohibited. Croydon when challenged was unwilling to bring forward any direct evidence of improper use of opium by midwives.

Consultation between Medical Witnesses.

The Representative Body had resolved in 1923 that it is desirable for medical men who may be called as witnesses in legal cases (especially under the Workmen's Compensation Act) to consult with each other before the case is heard so that they may, if possible, agree upon facts. This principle was, indeed, approved as long ago as 1905. A motion was proposed by Dr. G. H. LOWE (Cleveland):—

That wherever possible, in cases which depend on medical evidence alone, there should be a consultation between the medical witness on both sides with a view to agreement on facts, and that such cases should be settled by an arbitrator and not by a judge in open court.

The question was asked: Does any case depend on medical evidence alone? and doubt was expressed as to the expediency (if practicable) of withdrawing cases from public trial. The motion was lost heavily.

Fees Paid to Doctors called in by Midwives.

No fee is provided in the present scale for such special service as induction of premature labour, and representation has been made to the Ministry of Health. A motion by Lewes and East Grinstead proposed:—

That the Council be requested to approach the Ministry of Health with the object of revising the scale of fees which are paid to doctors called in on the advice of midwives, as this meeting considers the fees to be inadequate.

Dr. H. B. BRACKENBURY said that, although the subcommittee had never admitted that the present fees were adequate, a fair bargain had on the whole been struck. In Lancashire, it was pointed out, the scale corresponded with the fees charged to private patients under similar social conditions, and the scale was no more than the guarantee of payment if the medical man did not charge and obtain payment on his own scale. The motion was withdrawn by consent.

Approval was given to a special report of the Society of M.O.H.'s on the Midwives Act, subject to the ninth paragraph, reading:

A midwife who acts only as a monthly nurse should be allowed freedom from supervision under the rules of the C.M.B. if she be a fully trained nurse.

Fees for Ambulance Lectures.

It was proposed by Mr. TURNER, in regard to first-aid equipment in factories and the instruction how it should be used, that a fee of not less than £1 1*s.* per lecture be demanded. The British Red Cross Society's course was stated to be nine lectures of one and a half hours each (one hour lecture, half an hour practical), that of St. John Ambulance Association, six lectures of one hour each. After discussion the motion was carried in the following form:—

That when a course of ambulance lectures is desired in order to fulfil or supplement the requirements laid down in Section 29 of the Workmen's Compensation Act, 1923, the fee should be a minimum of £1 1*s.* per lecture, with an additional fee of 1*s.* per head for every member of the class in excess of 21.

On the proposal of Dr. W. F. DEARDEN (Manchester) it was referred to the B.M.A. Council to consider whether under the Act arrangements should be made for redrafting the ambulance requirements and for continuous medical supervision of the equipment and working. On the evidence of inspectors the boxes were found to be unsatisfactory in 43 per cent. of cases.

A BENEVOLENT FUND.

The Representative Meeting of 1923 acquiesced in the statement that "the charitable funds are a disgrace to our profession," but did not then proceed to definite action. Two motions, by South Essex and by Manchester, combined to the effect:—

That it be an instruction to the Council to examine and report on medical benevolent funds, including the possibility of a British Medical Association Benevolent Fund.

Dr. F. REES said that existing benevolent funds were managed by the hierarchy of the profession, and that an association of general practitioners could manage better. The R.M.B.F. had had, it was true, a large accession of membership during the past year owing to the Portsmouth discussion—600 new members with £1000 increased income; and the B.M.A. subscriptions to benevolence had increased by some £300. But as Dr. J. T. D'EWART said, there was still little consolation for the man who was down on his luck except to "get buried quick." In its divisions the B.M.A. possessed all the machinery for collecting and administering benevolent funds. Dr. BOLAM indicated that it would require about 10*s.* a head annually to produce even the present meagre result. That money must either come voluntarily out of the pockets of members or from an enhanced subscription. The motion to instruct the Council was carried by a large majority.

LEGAL LIABILITY IN MEDICAL CERTIFICATION.

The protection of medical men from litigation as a result of honest certification claimed the attention of the meeting from various aspects. Dr. DAVID ROXBURGH (Marylebone) proposed and Dr. W. J. LEIGHTON (Preston) seconded a motion:—

(i.) That the Council of the Association be instructed to take such steps as shall cause the liability of medical practitioners to actions at law for damages for issuing bona-fide certificates to cease; (ii.) that the methods employed to attain that end may include continuously repeated advice to all practitioners not to issue certificates except on evidence which is certain to convince a judge and jury—for example, that a patient suffering from homicidal mania or suicidal tendencies must first have succeeded in satisfying his ambition, or that a patient suffering from small-pox must first have communicated the disease to another person, &c.; and (iii.) that alternatively the law shall at once be so modified as to recognise that certain certificates are issued in the public interest, which includes that of the patient; that practitioners issuing them are public servants; that the public authorities accept the whole consequences of their errors, that actions shall only lie against the public authority, and that—if it be required—additional powers be given to the General Medical Council to deal with medical practitioners.

Dr. Roxburgh believed that the institution of proceedings against a medical man for the expression of honest opinion was no part of statutory law, he deprecated the infliction of what amounted to a fine for issuing bona-fide opinions, and he proposed his motion as a means of driving home to the public that if the medical certifier is to be tried by a jury, the evidence shall be such as will satisfy the jury. He dwelt on the psychological stress of the atmosphere in such trials and its effect on judge and jury. The motion as framed when put to the meeting was lost by a large majority.

CERTIFICATES UNDER THE LUNACY ACTS.

Dr. C. O. HAWTHORNE (Marylebone) then proposed and Dr. F. W. GOODBODY (Marylebone) seconded a motion to the effect :—

That the provision of a certificate under the Lunacy Acts by a qualified medical practitioner should be an act having the legal status of testimony given by a witness in a court of law, and should not render the practitioner liable either to any civil action or to any criminal charge, except in so far as the certificate may be shown to contain statements of essential importance which are proved to be inaccurate and to have been made with a wilful and deliberate intention to deceive.

Dr. Hawthorne said that the responsibility of certifying was accepted by the medical profession largely in the public interest. It was a heavy and, to many of them, an obnoxious responsibility, and the great majority of the medical profession would be glad to be relieved of it altogether. As the law stood the medical profession was the sole agency standing between the community and the person of unsound mind, and the sole agency by which persons of unsound mind were protected against themselves. Hence, though there was no legal compulsion on the medical practitioner to sign the certificate, the moral pressure in the great majority of cases was such that the practitioner felt himself, in the interests of the community and the patient, and for the credit of the profession, morally compelled to accept the responsibility attaching to the signature of a lunacy certificate.

The law recognised that the signing of the certificate was a public service by providing a certain measure of protection for the practitioner who signed it. Thus no action by a patient against a certifying practitioner relative to the certificate could succeed if the practitioner was able to show that, in the words of the Act of Parliament, he had acted "in good faith and with reasonable care." More than that, if an action was brought, the judge of the High Court would bring the proceedings to a prompt conclusion if the practitioner could satisfy the Court that there was no ground whatever for the suggestion that he had failed to act in good faith and with reasonable care. Dr. Hawthorne said that those two provisions formed a measure of protection of very great value, and were appreciated by the medical profession. But they were not adequate, because they left it still possible for an action to be begun against a practitioner, and, if there were some verbal or technical flaw either in the certificate or in any other part of the proceedings, the case might be forced into court, and the practitioner might be put to the expense, annoyance, and strain which were always involved in legal proceedings. In a word, no one signed a lunacy certificate without having before his eyes the fear that the signature might bring on him the penalty for an illegal action.

Partial Protection to be made Complete.

"My suggestion," said Dr. Hawthorne, "is that the protection which is now partial shall be made complete, and that the medical practitioner shall be placed in the same position as a witness who gives testimony in a court of justice. That is to say, for what he does in his capacity as a certifying practitioner he shall not be exposed to the chance of a legal action."

It might be urged that it was in the public interest that medical practitioners should be encouraged, when necessity demanded it, to sign these certificates. He submitted also that in signing such a certificate the medical practitioner, as a matter of fact, was only acting the part of a witness. He was giving evidence both of fact and of opinion before a judicial authority, and it was open to the judicial authority either to accept the evidence or to reject it, or to determine that he would not act until after further inquiries. "That is to say," said Dr. Hawthorne, "the voice which sends the patient into a lunatic asylum is the voice of the law, and all the medical practitioner does in connexion with the transaction is to give evidence of fact and to express an opinion." He went on to point out that the judicial authority who took part in the proceedings was completely protected. What he did or abstained from doing could not possibly be challenged by the person who by his signature was sent to a lunatic asylum. If the judicial authority enjoyed complete immunity from legal challenge surely the medical authority should have the same measure of protection.

The Solicitor's View.

Mr. W. E. HEMPSON, solicitor to the Association, congratulated Dr. Hawthorne on his clear and accurate exposition of the law. In the last 30 years he had had on many occasions to make use of Section 330 of the Act, which was the protective section to which Dr. Hawthorne had referred. He had found that when an action had begun in the courts and had proceeded up to a certain point, there was a disinclination on the part of the Master in Chambers, before whom the matter went in the first instance, and on the part of the judge, to whom appeal could be made, to dismiss that action if there was the slightest possibility of the plaintiff succeeding in it. If, he said, you had the Master against you in the first instance, even though you carried it to the Court of Appeal, you had very great difficulty. What Dr. Hawthorne wanted, apparently, was that no action should be permitted to be raised without official authority to that end. There were certain actions at law which could not be begun without the fiat of the Attorney-General, and it seemed to him that this would be a way of dealing with this question. Facts and affidavits would be supplied, and it would be in the power of the Attorney-General to refuse his fiat, in which case no action could be brought; or the fiat might be granted if there were circumstances to which the last part of the resolution referred. At present any litigant who could get a solicitor to act for him could go to the courts and issue his writ, and thus take the action up to the point at which the protective section for the dismissal of the action was reached. Dr. Hawthorne, he took it, wanted the matter to be put on some such footing as this: that unless some element as that alluded to in the last part of the resolution was shown to exist, the action could not be issued nor the writ set in motion.

The Question of Negligence.

Dr. BRACKENBURY drew attention to the question of negligence. What about the case, he asked, where a doctor had so neglected his duty as to make only a perfunctory examination—where he had been negligent in getting the information on which to found the certificate? The statement in the certificate might be inaccurate, but might be bona fide. The resolution, it seemed to him, would allow the negligent doctor to get off scot-free.

Mr. HEMPSON said he thought that Dr. Hawthorne was aiming at the highest he could get. He thought it very probable that they would have to accept less. Of course, if they got a change on the lines of Dr. Hawthorne's resolution the question raised by Dr. Brackenbury would arise. What they wanted was a change in the law as near Dr. Hawthorne's proposals as they could get, with modifications to provide for the point raised by Dr. Brackenbury.

Mr. E. B. TURNER expressed the hope that one of the duties of the committee of the B.M.A. Council which was dealing with this matter would be the preparation of evidence to place before the Royal Commission.

Dr. HAWTHORNE, in replying, suggested that negligence was a mere spectre. It was unthinkable that both doctors signing a certificate should fail to describe accurately the things they had seen and heard.

The resolution on being put to the meeting was agreed to with unanimity and enthusiasm, and the B.M.A. Council was asked to consider the question of preparing evidence to lay before the Royal Commission.

SATURDAY, JULY 19TH.

ORGANISATION OF THE ASSOCIATION.

On a motion to approve that part of the report of the Council dealing with organisation, Dr. S. MORTON MACKENZIE, chairman of the Organisation Committee, gave a brief account of the present position of the Association. The total membership to date was, he said, 27,533, being the highest number yet recorded. Last year nearly 2800 new members joined, attracted, he thought, by the proved willingness of the Association to take up anything to help its members. The Handbook for Recently Qualified Medical Practitioners was proving useful in recruiting, and was being distributed gratis to those attending the social meetings of welcome at teaching centres. At Newcastle-on-Tyne during the last two years every newly qualified man had joined. Prizes for essays on clinical or pathological subjects were being offered to final-year students, and he thanked the examiners—Prof. G. L. Gulland (Edinburgh), Prof. A. J. Hall (Sheffield), Sir William Hale-White, and Sir H. Rolleston (London)—for their services.

South African Branches.

In South Africa, although a referendum of the whole profession had shown a majority of 190 out of 1288 voting in favour of the formation of a South African Medical Association affiliated to the B.M.A., a second referendum of members of the South African branches of the Association resulted in seven out of the ten branches (with a total membership of 700) voting against the formation of a new association. The need there was for an efficient medical organising secretary and the Association was offering to pay half the expense over a period of three years. Dr. L. G. IRVINE (Witwatersrand) expressed the satisfaction of that branch at the action of the B.M.A., which might justly be called an *imperial* medical association.

Approving Signatures for Membership Applications.

A motion was brought forward by Darlington disapproving of the Council's suggestion to dispense with approving signatures on forms of application for membership, and affirming that such signatures are a safeguard against the division or branch being exploited by individuals unworthy of becoming members. An interesting discussion ensued, it being contended that an approving signature is no safeguard, for the undesirable member is apt to introduce a rather more undesirable, and that the effective retort is to put the worst member of the branch on the executive and make him chairman thereof. The meeting turned down the resolution on the assurance that every divisional secretary should be ex-officio member of the branch council which admits applicants.

A Woman Member of Council.

Croydon proposed that of the eight members of the B.M.A. Council elected by the Representative Body at least one shall be a woman. Dr. HAWTHORNE quaintly suggested that the proposal was out of order as the articles of association prohibited the conferring of privilege on any individual member or group of members, but the chairman allowed discussion to proceed. Dr. CHRISTINE MURRELL, a duly elected member of the Council, stated on behalf of the women members of the Association that they recognised that the Association was a democracy with no sex bar and that preferred to stand without privilege. There were in fact three women present as representatives of divisions or branches. Her statement was received with applause, and the motion was withdrawn by consent.

INDIVIDUAL DEFENCE.

Last year a proposal by Warrington that the individual defence of members in professional matters should be one of the functions of the Association was lost by a large majority. This year the question was again raised by motions from Warrington and Manchester which were combined for discussion into the clear issue:

That the B.M.A. Council be instructed to formulate a scheme for the medical defence of individual members of the Association either by itself or in coöperation with existing bodies.

Dr. J. S. MANSON, who again opened the discussion, described it as a recurrent question, never quite decided. Less than half the members of the Association were, he said, within the professional defence societies, although no doubt there were others assured in commercial companies. These presumably were acting for profit on some actuarial basis, and he saw no reason why the B.M.A. should not reap this harvest for itself. There was still scope, for whereas in 1912 63 per cent. of the numbers on the Medical Register were members of the Association, the proportion in 1923 was only 54·7 per cent. Need was greater, for even "token" payment to hospital staffs deprived them of their immunity from attack as honorary officers, and a proper defence department of the Association was needed to deal with chiropractors et hoc genus omne. To pass this motion would, he thought, be a fitting celebration of the twenty-first birthday of the new constitution. Dr. A. LYNDON (Guildford) asked, where are you going to draw your numbers for the new scheme? Excepting overseas members, who were considered ineligible for any existing scheme of individual defence, the 18,500 or so members of the Association equalled roughly the membership of the three professional defence societies. The proposal could only be justified on commercial grounds and the Association had no relevant experience behind it. He informed the meeting that the Medical Defence Union was already active in prosecuting unqualified practitioners. Dr. P. MACDONALD (York), admitting that defence was now efficient, argued that the Association could not afford to remain outside a matter so important to its membership. Dr. E. R. FOTHERGILL (Brighton) exhorted the meeting not to worry, but to get into a position to avoid appeals for help from members who had got into scrapes. Prestige suffered from such recurrent events. Even in the successfully defended action the practitioner found himself a couple of hundred pounds out of pocket. There was sufficient scope for defence in scooping up all the young men entering the profession. Dr. BRACKENBURY, expressing sympathy with the proposal, questioned whether it was good business at the moment. The National Union of Teachers, whose defence scheme had been cited, was, he said, preponderatingly concerned not with defence against individuals but against public bodies, and that the Association was already doing. Dr. MORTON MACKENZIE repeated the well-worn but weighty arguments against the proposal—it was too late in the day to begin, the opportunity had been allowed to slip, opposition from existing defence organisations was uncompromising, overseas assurance was impracticable, the proposal would not increase membership, rather the reverse; finally (a new point) the Association would lose its right of proceeding at the General Medical Council until the individual had been turned out of membership—a lengthy process. Dr. MANSON replied, and the motion being put was rejected by 76 votes to 58.

SCIENTIFIC SUBJECTS.

Mr. H. S. SOUTTAR, chairman of the Science Committee, in asking for approval of his section of the Council's report, remarked on the brilliant work presented for the scholarships which could have been allocated three times over. The Sir Charles Hastings Clinical Prize was offered with the object of stimulating systematic observation, research, and record in general practice, the proper sphere of research being always among a practitioner's own patients. On the motion of Sheffield the Council agreed favourably to consider the award of supplementary prizes in the event of more than one essay of merit being sent in. Dr. H. CAIGER mentioned the cause of appendicitis as a fitting object of general practitioner

research, the disease apparently arising on the contact of a primitive nation with civilisation. Mr. Souttar spoke of the appointment of a special committee to inquire into cardiac disease in childhood, which was really a group research undertaken at the instigation of its originators. He commended the practice to other groups.

NATIONAL HEALTH INSURANCE.

In moving the approval of this section of the report Dr. H. B. BRACKENBURY, chairman of the Insurance Acts Committee, described it as a record of familiar matters. A report was being prepared for submission to the Royal Commission, the notice being shorter than expected, for the Committee had to be prepared to submit evidence by Jan. 1st, 1925. If time permitted this interim report would be circulated for discussion by the divisions of the Association.

At the conclusion of the morning session the announcement was made amidst applause of the election of Dr. Brackenbury as chairman of the Representative Body for 1924–25.

ELECTION OF MEMBERS OF COUNCIL.

The election of 12 members of Council by grouped representatives was reported as follows: Dr. G. B. Hillman, Dr. I. W. Johnson, Dr. J. W. Bone, Dr. T. Ridley Bailey, Mr. E. B. Turner, Dr. W. Paterson, Dr. C. E. S. Flemming, Dr. S. Morton Mackenzie, Dr. C. E. Douglas, Dr. J. McGregor-Robertson, Dr. R. B. Mahon, Dr. J. Singleton Darling; all being unopposed except Dr. Johnson and Dr. Bailey.

ELECTION OF DIRECT REPRESENTATIVES TO THE G.M.C.

The election by the Representative Body of four from among its membership for nomination as direct representatives to the General Medical Council resulted in the following being proposed: Dr. R. A. Bolam, Dr. H. B. Brackenbury, Dr. J. A. Macdonald, Sir Jenner Verrall.

HOSPITAL POLICY.

An important debate was initiated on the motion of Mr. BISHOP HARMAN, who moved a recommendation of the Council that contributions to hospitals either by employers of labour or in the form of massed contributions from employees should be considered as contributions for services rendered.

An amendment proposing that contributions to hospitals for which a return of service was definitely stated should be the only ones from which any payment to the visiting staff should be made led to a long and interesting discussion, which showed the general desire of the representatives to maintain the voluntary policy. The amendment being withdrawn the resolution failed to obtain the necessary two-thirds majority.

MONDAY, JULY 21ST.

VOLUNTARY HOSPITALS.

The policy of the Association towards voluntary hospitals was the subject of many resolutions on the agenda which were crystallised by a motion from Mr. BISHOP HARMAN to the effect that:—

"Where the board of a voluntary hospital receives contributions from individuals in return for or in anticipation of treatment the members of the visiting medical staffs should receive recognition of their services, either in the form of an agreed honorarium or by means of a percentage of all such payments being passed into a special fund. Such honorarium or fund can be allocated in any manner which the visiting medical staff may determine."

After a long debate on the main resolution and on the vital amendments, Mr. Bishop Harman's motion was carried by a considerable majority.

THE ETHICS OF ADVERTISING.

A report from the Ethical Committee was submitted by Dr. Langdon-Brown, in which was proposed a number of restrictions as regards advertising or alleged advertising by members of the medical profession. The report was adopted with certain reservations. (*To be continued.*)

IMPERIAL CANCER RESEARCH FUND.

ANNUAL REPORT.

THE annual meeting of the Imperial Cancer Research Fund was held at the Examination Hall, Queen-square, London, W.C., on July 23rd. The Duke of Bedford presided. Dr. Sidney Martin, F.R.S., chairman of the executive committee, proposed the adoption of the twenty-second annual report, and said:—

"In proposing the adoption of the annual report it has been the custom for the chairman of the executive committee to give a summary of the report of the Director, but with your permission I shall take a somewhat wider view, and on the basis of the contents of the eighth scientific report[1] I shall survey the study of the varied aspects of the cancer problem under the different scientific disciplines which at present are engaged upon it. And firstly, as the oldest, I shall consider the clinical study of cancer in man. This is represented in the eighth scientific report by the monograph of Dr. Alexander Scott on the paraffin dermatoses and paraffin cancer. The executive committee authorised its inclusion in the report because of its unique features, which are the long-continued, careful observation on a fairly large body of workmen exposed continuously to a peculiar form of chemical irritation known, for a long time, to induce cancer. The acute and chronic skin lesions in workers in crude paraffin are described and figured in a series of beautiful plates made from Dr. Scott's own photographs. The relation of these lesions to the subsequent development of cancer is gone into, on the evidence of the individual histories of the workmen, and the whole body of facts surveyed with a masterly grasp of detail. I need only draw your attention to the absence of any close relation between the intensity of the acute early lesions and the later development of cancer, so that in some individuals only extremely slight indications of skin irritation preceded its development. Another point to be noted is the long number of years, never less than 15–20, after which the disease began. The proportion of the workers in which cancer developed was found to be less than 2 per cent. per annum of those engaged, and Dr. Scott shows that it is mainly in the men engaged in certain stages of the preparation of paraffin oil from shale that these cases occur. On the basis of his findings a very complete and, it may confidently be hoped, effective preventive régime has been instituted by the Scottish Oils Company. It has already reduced the incidence of the acute irritative disturbances in the operatives, but its effect on the occurrence of cancer in them can only be seen after a longer lapse of time.

"The executive committee desire to thank Dr. Archibald Leitch, the director of the Research Department of the Cancer Hospital, for allowing the publication in Dr. Scott's paper of a summary of his results in testing the crude and refined oils supplied by Dr. Scott for their carcinogenic powers on animals. These results confirm the importance of the unrefined oils incriminated by Dr. Scott and show the innocuousness of the refined product. This fact should serve to reassure those who have been using refined paraffin medicinally and may have become alarmed by these reports of the production of paraffin cancer.

"In the domain of experimental pathology there are three papers in the report, two by Dr. B. R. G. Russell and one by Dr. J. A. Murray. Experimental pathology may be regarded as an extension of the methods of clinical study to disease as it occurs in animals under controlled conditions. Dr. Russell's papers deal with the production of sarcoma in mice and rats by the subcutaneous inoculation of tar. These observations emphasise the fundamental unity of the cancer process as it occurs in connective tissues (sarcoma) and in epithelial tissues (carcinoma). Dr.

[1] An exhaustive analysis of this valuable report appeared in THE LANCET, Dec. 22nd, 1923, p. 1368.

Murray's paper deals with the meaning of the long period—10 to 20 years in man, 5 to 12 months in mice—during which cancer-producing agents must act before the disease sets in, and the paradoxical result that once an animal has become cancerous there is an apparent incapability to react anew with cancer development to fresh applications of tar to another part of the body. These observations illuminate the rarity of multiple primary cancer. The space devoted to histological details in these papers is merely an expression of the importance of the microscopic control which enters at every stage of what is essentially a clinical or biological study of new growths.

"Dr. A. M. Begg's paper on dissemination in tar cancer belongs more strictly to the province of pathological histology. It is entirely descriptive, and deals with peculiarities in the mode of spread of epithelioma, particularly along the sheaths of the nerves.

"Experimental cytology is represented by the work of Dr. A. H. Drew on tissue culture. His work clears up to a great extent the hitherto enigmatical departures from the normal histological picture met with in malignant new growths, showing how this phenomenon can be duplicated in normal tissues, or, on the other hand, how atypical undifferentiated malignant new growths can be made to assume the normal form without loss of their fundamental malignant characters. He has also shown the close relationship between the processes of growth in malignant cells and those responsible for repair of injury.

"The remaining papers are biochemical in nature. Biochemical investigations are of two kinds: those which apply the methods and reactions of chemistry to the study of the behaviour of living organisms, and those in which, for want of test-tube reactions, the reactions of living organisms are used to demonstrate the presence or absence of chemically active substances or to elucidate their rôle in the animal economy. Dr. Russell's papers on carbohydrate metabolism of normal and cancer cells belong to the former category; Dr. W. Cramer's work on vitamins to the latter. Dr. Russell's investigations, which grew out of a study of cell respiration, have led to the discovery of certain sugar reactions (analogous to those used in the separation of nearly related bacterial species) which are apparently peculiar to cancer cells. They are being made the starting-point of chemotherapeutic experiments. Dr. Cramer's vitamin work deals objectively with an aspect of cancer growth, which has led to a great deal of loose speculation. He shows that when put to the test of direct experiment, no degree of vitamin deficiency compatible with life has any effect on malignant proliferation.

"From this survey you can see that the work in our laboratory embraces a very comprehensive series of investigations touching varied aspects of the cancer problem, all of them of fundamental importance. The achievements of the past warrant us in meeting the future with sober optimism, and give me confidence in recommending to you the adoption of the twenty-second annual report."

Sir John Bland-Sutton, P.R.C.S., seconded the motion, which was adopted.

Reports of Executive Committee, Director, and Hon. Treasurer.

The executive committee report with regret the resignation of Sir William Church from the chairmanship of the committee, in which he has been succeeded by Dr. Sidney Martin, F.R.S.; Sir William Church becomes a vice-president of the Fund. They record that the "Stroud Laboratory" at Mill Hill is now nearing completion, and is expected to be in working order within the next month. During the year material from the laboratories of the Fund has been supplied to ten investigators working in this country, and also to workers in Amsterdam, Brussels, Strasburg, and Brazil. On the other hand, material for investigation has been received by the Director from other laboratories. A list of the papers published from the laboratory during the year is appended.

Dr. J. A. Murray, the Director, summarises the papers in the eighth scientific report referred to by the Chairman. He states that the investigations on the venereal sarcoma of dogs and on the infectious sarcoma of fowls have been interrupted by the removal of the country laboratory to new premises, and the delay which has occurred in erecting the new laboratory. In consequence, Dr. Begg's work under the Atholstan Grant on these tumours is not yet far enough advanced for publication. The experiments on the production of lymphomatous tumours in mice, carried out to test the conclusions of Dr. James Young, have proved entirely negative, even when carried out with cultures of the supposed causal organism, kindly supplied by Dr. Young himself.

Sir George Makins, the hon. treasurer, reports that subscriptions and donations have amounted during the past year to £1335, an increase of £383 over the previous year, and, in addition, a grant of £500 has been received from the Worshipful Company of Goldsmiths. Legacies amounted to £5403 10*s.* 6*d.*, against £3075 15*s.* 6*d.* last year; hence the total receipts, apart from dividends from investments, amounted to £7239. The general research expenditure has increased during the past year, excluding the Mill Hill and Stroud Laboratory account, by £2326 9*s.* 5*d.* This is largely accounted for by additional material, instruments, and chemicals, the publication of the eighth scientific report, and by the salaries of two additional members of the scientific staff.

The President's Speech.

The Duke of Bedford, in moving a vote of thanks to the executive committee, commenced by testifying to the loss sustained by the death of Sir John Tweedy, who had taken the greatest interest in the Fund for many years past as a member of the general committee. He went on to welcome Sir George Newman, the chief officer of the Ministry of Health, who had joined that body, and to congratulate Sir George Makins on a good financial year, and a substantial increase in the amount of subscriptions and donations. He referred to the approaching completion of the Stroud Laboratory at Mill Hill, provided, free of cost to the Fund, by the executors of the estate of the late Mr. Augustus C. Stroud. He concluded by explaining the relations between the Fund and the British Empire Cancer Campaign. It is now satisfactory, he said, to hear that the provisions formerly thought necessary by this Fund have been adopted, so that under the new articles of association of the British Empire Cancer Campaign an advisory committee is appointed consisting of members of the Royal Society and of the Medical Research Council to advise on the allocation of funds for scientific research; and the Imperial Cancer Research Fund has appointed representatives on the Grand Council of the Campaign.

A cordial vote of thanks to the Duke of Bedford for presiding at the meeting having been proposed by Sir Humphry Rolleston, Bart., the proceedings terminated.

MEMORIAL TO THE LATE MR. G. P. NEWBOLT.—A fund has been opened to establish a memorial to the late Mr. Newbolt in the Royal Southern Hospital, Liverpool, where he had filled the post of senior surgeon for a quarter of a century. The organising committee has deemed it fitting that, in addition to a portrait of Mr. Newbolt, the memorial might take the form of carrying out certain improvements in the hospital that Mr. Newbolt had at heart. These are: (1) the extension of the X ray department; and (2) provision of additional accommodation for the nursing staff. Donations may be sent to Mr. Lyon H. Maxwell, hon. treasurer, at the hospital, or to any of the members of the Memorial Committee, whose names will be found in our advertisement columns.

Correspondence.

"Audi alteram partem."

EPIDEMIC PLEURISY.

To the Editor of THE LANCET.

SIR,—The description of an outbreak of this affection given by Dr. Bruce Williamson in THE LANCET of July 12th shows that he was dealing with the same condition as that described by Dr. David Greene under the title Epidemic Pleurodynia in the *Archives of Pediatrics* for May of this year. The American outbreak occurred at a large infirmary in New York, and of the 1230 boy inmates, 141 were attacked. The symptoms were, after a short period of malaise, pain in the chest or abdomen, headache, and fever. The total duration of the fever was from one to four days, convalescence was rapid, and there were no sequelæ. No reference is made to the presence or absence of pleural friction—perhaps the stethoscope was not used. Laboratory investigations were very thoroughly carried out with negative results. Dr. Greene also gives references in medical literature to similar outbreaks in other parts of America, and it is interesting to read the various descriptive titles used. Amongst these are "The Devil's grip," "Intercostal neuritis," "Dengue," and "Epidemic transient diaphragmatic spasm." Dr. Williamson has supplied yet another name, and his clinical findings seem to justify the term epidemic pleurisy. Perhaps the illness is not severe enough to attract the attention of public health authorities, but any further experiences of this condition from those in charge of schools or other institutions would be welcomed.

I am, Sir, yours faithfully,

July 21st, 1924. G. A. SUTHERLAND.

CAPT. KATER'S "PULSEOMETER"?

To the Editor of THE LANCET.

SIR,—Some remarkable antiquated instruments have been recently presented to the Museum of the Royal College of Surgeons of England by Miss Rundle, niece of their deceased owner, Mr. Henry Rundle, F.R.C.S., consulting surgeon to the Royal Portsmouth Hospital. Many were clearly out of date and must be considered as the stock of a predecessor. Among them is a Quain's stethometer of the second pattern, as modified on the suggestion of Coxeter. It is figured and described in the *Medical Times and Gazette* (1862, i., 595). Sir Richard Quain's original stethometer had been already figured and described in the same manner in THE LANCET, vol. i., 1851, p. 126.

Another dial-bearing instrument remains enigmatical. The following words are distinctly printed on the dial: "H. Kater Invr. Gilbert & Son, London." It is a cylindrical brass instrument, nearly 2 inches in height, with an enamelled dial, as in a watch, an inch and a half in diameter. This dial is marked to 100, subdivided into 10 parts, and a large indicating hand works from the centre. Its lower part is occupied by a lesser dial divided into 12 parts, and furnished with a smaller indicating hand. This dial is supported on a tripod, three brass rods fixed on a platform, a circular brass plate which screws on to the cylinder. There is a space of about 1 inch between the dial and a split pin on the centre of the platform. The larger indicating hand is governed by a small cog inside the dial, which was probably turned either by a piece of elastic or a spring, now absent, but it must have stretched between two fittings one of which is fixed in the pin of the cog-wheel of the large indicating hand, while the other was fitted into the split pin in the centre of the platform. The small cog of the larger hand rotates the big wheel on the small dial, which is gauged to 1 in 100. The brass cylinder is perforated by 24 circular holes a quarter of an inch in diameter—the object of this arrangement is not clear.

The nature of this instrument is mysterious. Mr. J. Barry Hopkins, a surgeon's cutler of nearly 60 years' experience, maintains that it is probably a pulseometer, having known similar contrivances that were in use many years ago. This instrument bears the name of Capt. Kater, F.R.S. (1777–1835), a man of science whose life is recorded at some length in the "Dictionary of National Biography" and the "Encyclopædia Britannica." Numerous scientific memoirs are noted, but though Kater took a share in a work on cataract by Guthrie, there is no mention of any contrivance for use in medical research. I have consulted many of our elder physicians, and the librarians of the Royal Society of Medicine and of the Royal Colleges of Physicians and Surgeons, but after long research, for which I feel much indebted to these gentlemen, no mention of this "pulse-ometer" can be found, nor have any of them ever seen this contrivance.

Yet here is a sample preserved in the Museum of the Royal College of Surgeons. There must be others in existence, so perhaps some reader of THE LANCET can throw a little light on the subject. Mr. W. Finerty, assistant in the Museum, has carefully examined its mechanism, and the result is, as Sir Arthur Keith and myself admit, that there is no government over the control of the hands, and no mechanism for regulating time. Who can fill in the *hiatus valde deflendus*?

I am, Sir, yours faithfully,

ALBAN DORAN, F.R.C.S.,
Consulting Surgeon to the Samaritan Free Hospital.

The Museum, Royal College of Surgeons of England,
July 18th, 1924.

THE DILETTANTE RADIOLOGIST.

To the Editor of THE LANCET.

SIR,—Both at home and abroad radiologists are complaining of the havoc wrought by the dilettante in X ray treatment, and therefore your leading article of to-day's date is topical. The problem is delicate, the more so because radiology is still in its infancy, and the expert of to-day may, if he does not keep abreast of the times, be the dilettante of to-morrow. We cannot, in fact, draw a hard-and-fast line between the skilled and unskilled radiologist, and even the former must occasionally have unlucky experiences, either in person or among his patients. These considerations ought not, however, to divert us from a careful consideration of the means to be adopted in an attempt to bring X ray accidents down to the irreducible minimum. The procedure to which some radiologists would perhaps subscribe is the institution of an examination in radiology and the granting of a special diploma without which no one would be expected to give X ray treatment. You refer to the procedure without enthusiasm. The multiplication of special diplomas is regarded with disfavour by many for a variety of reasons, most of which leap to the eye. It might be argued forcibly that to discourage and almost forbid the practice of X ray treatment, save in the case of holders of some special diploma, would be to make too great an incursion into the liberty of doctors, and that the precedent thus created might have undesirable consequences It might, for example, lead to the suggestion that in other fields of therapeutics a similar tacit or implied veto should be imposed. The expert, or the physician who considered himself an expert, in the administration of tuberculin might plead for a special tuberculin licence, arguing that tuberculin may be a lethal weapon in the hands of the less expert. The same argument would be applicable to the administration of insulin, which requires greater care and knowledge than the prescription of castor-oil.

The analogies are not sound, and radiology is in a peculiar position. In some respects it is comparable with aviation. An ordinary diploma to practise medicine may be compared with a licence to drive a motor-car, and a special diploma in radiology with an aviator's certificate. A highly skilled mechanic may

be perfectly qualified to drive others in a motor-car, but if he were not a fully qualified aviator we would not trust him to take us for a flight. With growing knowledge of the risks of X ray treatment, the public may require of the practitioner giving X ray treatment that he possess a special diploma or can show other evidence of expert knowledge in this field. And to protect himself in case of mishaps and consequent lawsuits, the practitioner who gives X ray treatment may find a special diploma of great value. These things must be borne in mind.

I am, Sir, yours faithfully,

July 19th, 1924. SPECIALIST IN OTHER FIELDS.

The Services.

ROYAL ARMY MEDICAL CORPS.

PROMOTION EXAMINATIONS.

THE King's Regulations have been amended so as to provide that, as from April 1st, 1925, a major of the Royal Army Medical Corps before promotion to lieutenant-colonel will be examined in the subjects laid down in Appendix X. of the Regulations. The examination in these subjects may be taken at any time after an officer's promotion to the substantive rank of major, provided that the candidate can produce a certificate from a D.D.M.S. or an A.D.M.S. to the effect that he has received instruction in the subjects covered by the examination, and that he is considered fit to present himself for examination. In order to assist officers in their preparation for this examination all necessary arrangements will be made for the adequate instruction of majors, Royal Army Medical Corps, in army medical organisation and administration, hygiene, and the employment of the medical services in peace and war. This instruction will be carried out by means of lectures followed by discussions, war games, and field exercises, by the attachment of officers to the different departments in hospitals and, where possible, to the offices of administrative medical officers, for instructional purposes.

TERRITORIAL ARMY.

N. W. Hammer, D. L. Kerr, and P. J. Stokes to be Lts.

Lt. W. B. A. Lewis (late King's Shropshire L.I.) to be Lt.

Sanitary Companies: Capt A. S. Hebblethwaite (late R.A.M.C., T.F.) to be Maj. and to comd. 6th (Northern) Sanitary Company.

Supernumerary for service with the O.T.C.: Capt. W. E. Le Gros Clark (late R.A.M.C., S.R.) to be Capt.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Lts. (D.) T. B. Cooper, W. M. Bull, G. K. MacLennon, and W. H. Hume (proby.) to the *Victory*, and to R.N. Hospital for training.

ROYAL AIR FORCE.

The undermentioned are transferred to the Reserve, Class D.2: Squadron Leader E. P. Punch, and Flight Lts. C. H. B. Thompson and B. C. W. Pasco.

INDIAN MEDICAL SERVICE.

Maj. (now Lt.-Col.) G. Browse relinquishes the actg. rank of Col. on ceasing to hold the appt. of A.D.M.S. (Nov., 1919).

Capt. J. H. Barrett relinquishes his temp. commn.

THE LATE DR. A. MANTLE.—Dr. Alfred Mantle, of Swan-road, Harrogate, who died suddenly on July 10th while on a visit to a professional colleague in the town, was in his seventieth year. He received his medical education in the London Hospital, graduating M.R.C.S. Eng. in 1873 and M.B. Durh. in 1880. Two years later he obtained the M.D. Durh., and in 1893 the M.R.C.P. Lond. He commenced practice in Halifax and became one of the senior physicians to the Halifax Royal Infirmary. He held for a time the office of president of the Halifax Medical Society and the Bradford Medico-Chirurgical Society. About 1903 he settled in Harrogate, and later became president of the Harrogate Division of the B.M.A. and of the Harrogate Medical Society, and a trustee of the Holt Homes at Harrogate for Halifax people. Dr. Mantle published articles in the medical press, dealing mainly with the ætiology and treatment of rheumatism, and a short time ago won an international prize of £120 for an essay on the subject of rheumatism, and earmarked the sum for the benefit of children suffering from rheumatism and consumption.

Parliamentary Intelligence.

HOUSE OF LORDS.

WEDNESDAY, JULY 16TH.

Smoke Abatement Bill.

Earl DE LA WARR moved the second reading of the Public Health (Smoke Abatement) Bill, which he said was designed to amend the law relating to smoke nuisances. The measure was on similar lines to those introduced on two previous occasions. The only hope of getting the Bill passed this session was by general agreement.

The Bill was read a second time.

HOUSE OF COMMONS.

WEDNESDAY, JULY 16TH.

Modern Sewage and Water Systems in Britain.

Mr. WALTER BAKER asked the Minister of Health how many local authorities in this country had not installed modern sewage and water systems owing to their inability to raise the necessary financial assistance.—Mr. WHEATLEY replied: I regret that I have no information of the number of authorities who have not installed modern sewage and water systems because of lack of means.

Evidence before Lunacy Commission.

Mr. ROBERT RICHARDSON asked the Minister of Health whether his attention had been called to a circular letter issued by the Secretary to the Royal Commission on Lunacy, intimating to those desirous of giving evidence before it that in the event of their application being "turned down" they would not be notified of this decision, but would be left in uncertainty for an indefinite period; and would he take steps to see that some more satisfactory procedure was adopted and, further, that a reason for rejection of the evidence should be given, in order that the public might feel no lack of confidence in the selection of evidence made by the Commission.—Mr. GREENWOOD replied: The hon. Member has been misinformed as to the terms of the letter to which he refers. A very large number of persons have already applied to give evidence before the Royal Commission; and, in the meantime, such persons have been informed that their applications will receive consideration, and that if the Commission decide to hear evidence from them, a further communication will be sent. I should add that the procedure of a Royal Commission is entirely within its own discretion.

Hospitals and Sanatoria in Rural Districts.

Mr. ERNEST BROWN asked the Minister of Health whether any document was in the possession of his department showing the number of hospitals, isolation hospitals, tuberculosis sanatoria, asylums for the mentally defective, and Poor-law institutions situated in agricultural parishes; and if he would make it available to Members of the House for county constituencies.—Mr. GREENWOOD (Parliamentary Secretary to the Ministry of Health) replied: My right hon. friend is afraid that no document giving the information which the hon. Member has in mind is available. He will be glad, however, to endeavour to obtain information as regards any particular parish for which hon. Members may ask.

Dust and Refuse Heaps in London.

Mr. GILBERT asked the Minister of Health whether his department had recently considered the question of dust and refuse disposal in London and greater London; whether he was aware that there were now several refuse dumps in the lower reaches of the Thames which were burning through self-combustion, and were a great nuisance to the districts concerned; and whether, in view of the importance of the subject, he would consider as to a committee being set up to fully consider the matter, in view of the development of new housing schemes outside London.—Mr. GREENWOOD replied: A list of special precautions in connexion with refuse tips was prepared by my department in 1922, in consultation with local authorities; and my right hon. friend is advised that, where these precautions are observed, nuisances are avoided. He is having special investigations made as to the conditions in the lower reaches of the Thames.

Pension Scheme for Nurses.

Mr. ATHOLL ROBERTSON asked the Minister of Health whether he could see his way to establish a pension scheme for nurses on a contributory basis, with substantial aid from the State, for all nurses that had faithfully and continuously

served public bodies, hospitals, and other institutions, and give assistance to the private nurse in a fair and reasonable way.—Mr. GREENWOOD replied: While my right hon. friend is in sympathy with the object which the hon. Member has in view, he is advised that the adoption of such a scheme as is suggested would be wholly impracticable.

Deaths from Vaccination.

Mr. BROAD asked the Minister of Health how many death certificates were sent in during the year 1923 in which the words vaccination or vaccine occurred; what were the ages of the persons to whom these certificates referred; and how these deaths were ultimately classified.—Mr. WHEATLEY replied: The words in question occurred upon 11 death certificates received during 1923 in England and Wales. In one of these cases (a child aged 1 month) it was ascertained upon inquiry that the vaccination had no connexion with the death, which was accordingly classified to the certified cause of heat-stroke. The remaining 10 cases, together with two others in which the words did not occur upon the certificate but which were ascertained upon inquiry to be due to vaccinia, have been classified as follows:—

Classified to vaccinia.	Classified to other causes in association with vaccinia.
9 months	3 months .. .. Cellulitis.
19 years	14 years .. .. Septicæmia.
1 month	6 months .. .. Convulsions.
6 years	1 month .. .. Septicæmia.
10 ,,	
6 ,,	
15 ,,	
50 ,,	

Infant Mortality in Market Drayton.

Sir CHARLES OMAN asked the Minister of Health whether he was aware that Market Drayton had the highest rate of infant mortality of all the urban districts of Shropshire, including Shrewsbury, the figures being total urban districts 52 deaths per 1000 births, and Market Drayton 111 deaths per 1000 births, and that this excess of infant mortality had been consistently high since the formation of the urban district; and whether he would cause some medical member of his staff to make inquiry whether the guardians of this urban district made sufficient provision for necessitous mothers, expectant mothers, and new-born children in the matter of medical aid, provision of milk, and other foods.—Mr. WHEATLEY replied: I am aware that the infant mortality rate in Market Drayton has generally been in excess of the average for the whole of the urban districts in Shropshire, but I would point out that this was not the case in two of the nine years which have elapsed since the formation of the urban district, and that the rate for 1923 was 85 per 1000 births, as compared with 111 in 1922. As regards the last part of the question, the county council is the authority responsible for maternity and child welfare work in this urban district, and I will arrange for an early inspection by one of the medical officers of the department, when inquiry will be made.

THURSDAY, JULY 17TH.

Tuberculosis Officers and Attributability.

Mr. ROBERT MORRISON asked the Minister of Pensions for what reason tuberculosis officers were prevented from expressing an opinion upon whether an ex-Service man's disease was attributable to, or aggravated by, war service; when this instruction was issued by the Ministry; and whether it was intended to continue it.—Mr. F. O. ROBERTS replied: The first part of the question does not quite correctly state the position. Tuberculosis officers of local health authorities are concerned with the treatment of tuberculosis and they are not invited to express an opinion as to entitlement in cases which come before them solely for medical treatment. But arrangements have been made for tuberculosis officers to sit as members of medical boards which deal with cases of this disease, and as such it becomes their duty to assist in arriving at the official decision on entitlement which can only reliably be formed when the records of the man's medical history during his service and subsequently are available. The arrangements in connexion with the part to be played by tuberculosis officers in cases of this type were made some 18 months ago. They have, I am glad to say, been found to work well.

Cost of Pensions Ministry Hospitals.

Mr. PHILIP OLIVER asked the Minister of Pensions what was the cost per patient per day of hospitals directly administered by the Ministry; whether such cost was greater than the average capitation grant given to hospitals administered under the Ministry by voluntary societies; and, if so, would he, as and when a reduction of bed accommodation became necessary, consider the advisability of closing wards in Ministry hospitals in preference to closing hospitals administered by such societies.—Mr. F. O. ROBERTS replied: The average daily cost to the Ministry per patient in hospitals administered by my department is approximately the same as the cost in hospitals administered for use by my department by voluntary bodies, namely, 8*s.* 8*d.* a day. The Ministry maintain separate institutions only where that course is necessary to supplement otherwise existing accommodation or to provide treatment for special war disabilities (for example, neurasthenia) for which adequate treatment is not otherwise obtainable. In pursuance of that policy the position is reviewed from time to time, and in the selection of accommodation to be relinquished the principal determining factors must be the type of treatment for which accommodation is required and the situation of the various institutions.

Maintenance of Pauper Lunatics.

Mr. CHARLES EDWARDS asked the Minister of Health whether he was aware that the amount of 4*s.* per head repaid to boards of guardians under the 1888 Act for the maintenance of pauper lunatics in asylums was totally inadequate; and would he take steps to secure that at least half of the actual cost for the maintenance of such patient should be repaid to guardians from national funds.—Mr. GREENWOOD replied: Legislation would be required for the alteration of this grant, and my right hon. friend cannot undertake to introduce such legislation at the present time.

Mentally and Physically Defective Children.

Mr. ACKROYD asked the President of the Board of Education the number of mentally defective and the number of physically defective children for whom grants were being paid to local education authorities, and how these numbers compared with 1914.—Mr. TREVELYAN replied: During the year ended March 31st, 1923, grants were paid to local education authorities in respect of an average attendance of 12,907 mentally defective children and 9793 physically defective children. The Board also paid grants in respect of that year to bodies other than local education authorities for an average attendance of 297 mentally defective children and 1732 physically defective children. Thus they paid grants for a total average attendance of 13,204 mentally defective children and of 11,525 physically defective children. For the year ended March 31st, 1914, the total average attendance of mentally defective children on whom the Board paid grants was 11,307, and on physically defective children 6075.

Danger to Health of Imported Hides, &c.

Mr. TILLETT asked the Home Secretary whether he was aware of the hardships and risks to health and life imposed upon workers handling hides, horns, hoofs, bones, wool, and hair, particularly those imported from India and Asia generally; and, in view of the fact that docks, wharves, quays, warehouses, and workshops at which these commodities were handled for transporting and sorting were not scheduled under the Factory Acts, would he take steps to include in the forthcoming legislation such clauses as would cover all those engaged in the handling of these commodities.—Mr. HENDERSON replied: I am well aware of the risk from anthrax to which these workers are exposed, and will take every possible step to meet it. There is already power under the Factory Acts to make regulations for the protection of persons employed in docks and the other premises mentioned, and regulations are in force in regard to the handling of hides imported from Asia or Africa. Experience shows, however, that the most, if not the only, effective remedy consists in the disinfection of the material, and the most hopeful line of advance, therefore, will be to utilise, wherever practicable, the powers conferred by the Anthrax Prevention Act, 1919, by providing for compulsory disinfection at the port of entry. As my hon. friend knows, certain materials are already being compulsorily disinfected at the Government station at Liverpool, and the extension of this requirement to other materials, and in particular to East India wool, is now under consideration.

Silicosis among Miners.

Mr. FREDERICK GOULD asked the Home Secretary if he could now give further information as to the reported cases of silicosis among miners; and whether any progress had been made with a view to schedule the same as an industrial disease under the Workmen's Compensation Act.—Mr. HENDERSON replied: As the hon. Member will be aware, the reported occurrence of silicosis among coal-miners, due to their work in the mines, has been the subject of inquiry by the Health Advisory Committee of the Mines Department, but I am informed by the Mines Department that the evidence so far received has proved to be untrustworthy. The investigation is, however being continued.

FRIDAY, JULY 18TH.

Wireless at St. Bartholomew's Hospital.

Mr. WALTER BAKER asked the Minister of Health how many institutions under his control had been equipped with wireless receiving sets; and whether, having regard to the success of the installation at St. Bartholomew's Hospital, he would look favourably on any proposal to install such apparatus.—Mr. WHEATLEY replied: I have no information as to the number of institutions in which wireless sets have been installed. I am advised that if such an installation is desirable for the well-being of the inmates of the institution it would be competent to the authority to incur reasonable expenditure for the purpose.

MONDAY, JULY 21ST.

Vaccination in India.

Mr. CLARKE asked the Under Secretary of State for India if his attention had been called to the imprisonment of parents in Hyderabad, Sindh, who had conscientious objections to vaccination; and, if so, if it was the intention of the Government of India to amend the Vaccination Act so as to assimilate the law to that prevailing in this country.—Mr. RICHARDS replied: The answer to the first part of the question is in the negative. I am not aware that the Government of India contemplate an amendment of the Vaccination Act.

Anthrax Contagion in Indian Wool.

Mr. TILLETT asked the Under Secretary of State for India the conditions of labour enforced in India upon workers handling, sorting, and transporting hides, horns, hoofs, bones, wool, and hair, and what regulations were imposed to prevent the contagion of anthrax from reaching such commodities; and could he indicate the hours of employment and system of labour operating amongst those engaged in handling these commodities.—Mr. RICHARDS replied: Workers in India employed in factories, including wool mills, are subject to the provisions of the Factories Act, a copy of which I shall be happy to supply to my hon. friend. A provision was added to the Act in 1922 enabling the Governor-General in Council to make rules for the disinfection of wool used in factories which may be infected with anthrax spores. So far as I am aware no rules have been framed, probably because anthrax is an exceedingly rare industrial disease in India.

Indian Medical Department Allowances.

Mr. HOPE SIMPSON asked the Under Secretary of State for India whether, seeing that during the war officials of the Indian Medical Department drew separation and other kindred allowances and that under Royal Warrant, A.O. 357 dated August 28th, 1920, marriage allowance was substituted for those allowances, whether members of the Indian Medical Department now drew marriage allowance; and, if not, for what reason that allowance was withheld from them.—Mr. RICHARDS replied: Marriage allowance was granted in India to personnel of the British Service and to certain other ranks drawn from the British Service and serving under the same general conditions of pay. It was not considered necessary to extend the allowance to the Indian Medical Department, the personnel of which, with few exceptions, are domiciled in India. They were allowed to draw separation allowance on account of special war-time conditions.

Death and Sickness in Gold Coast Mines.

Dr. CHAPPLE asked the Secretary of State for the Colonies whether he had yet been able to discuss with the Governor of the Gold Coast Colony the death- and sickness-rate in the mines of that colony; and, if so, whether he was in a position to make any statement.—Mr. THOMAS replied: I have decided to forbid further recruiting for the mines in the Northern Territories of the Gold Coast until conditions are improved. As a first step I arranged a few days ago that Sir William Simpson, a sanitary expert of high authority, should proceed to the colony to investigate and furnish me with a report on the sanitary conditions of the mines and mining villages, and the reasons for the high death-rate among the labourers, and to suggest measures for their improvement. Sir William Simpson is already on his way to the Gold Coast.

Visits to Lunatics in Asylums.

Sir JOHN MARRIOTT asked the Minister of Health whether the parents of a patient detained in a lunatic asylum were, by regulation, denied access to, or communication with, the patient if the wife of the patient raised objection to such communication.—Mr. WHEATLEY replied: I am not aware of any such regulation. The question of allowing the friends or relatives of a patient to visit or of withholding communications addressed to a patient is entirely within the discretion of the medical superintendent of the mental hospital, who would be guided in his decision by the patient's condition.

Medical News.

UNIVERSITY OF OXFORD.—The following awards of Theodore Williams scholarships are announced:—Human Anatomy (£50 for two years): Denis Hubert Brinton, New College. Physiology (£50 for two years): George Eric Macdonald, New College. Pathology (£60 for two years): Thomas Cecil Hunt, B.A., Magdalen College.

UNIVERSITY OF CAMBRIDGE.—At recent examinations the following candidates were successful:—

DIPLOMA IN MEDICAL RADIOLOGY AND ELECTROLOGY.

Part I., Physics and Electrotechnics.—John Lavelle, Walter M. Levitt, Frewen Moor, Cusach J. K. O'Malley, James R. K. Paterson, John V. Sparks, and Maurice Weinbren.

Part II., Radiology and Electrology.—Arthur R. Colyer, Charles R. Enticknap, Alexander C. Fowler, Shanazar G. Galstaun, Pratap S. Khosla, John Lavelle, Walter M. Levitt, Alexander G. MacLeod, Thomas D. Overend, James R. K. Paterson, Gordon D. Thomson, Kenneth F. Vickery, John Wall, and Barbara G. Wood.

UNIVERSITY OF MANCHESTER.—As a result of the recent examination, the following obtained certificates in school hygiene, subject to confirmation by the Senate: Enid F. Stowell, M.B., Ch.B., D.P.H., and Ethel White, M.B., Ch.B., D.P.H.

The Sidney Renshaw Prize in Physiology has been awarded to W. H. Newton, and the University Prize in Medicine to Robert Newton. Gold medals were awarded on dissertations for degree of M.D. to K. V. Bailey and F. R. Ferguson. The Sheridan Delépine Fellowship in Preventive Medicine was awarded to L. P. Lockhart.

UNIVERSITY OF LIVERPOOL.—As the result of the recent examinations in the Faculty of Medicine, the following are the names of the successful candidates:—

DEGREE OF M.D.

H. Cohen, M. J. Cohen, and B. L. McFarland.

DEGREE OF PH.D.

T. Southwell.

DEGREES OF M.B. AND CH.B. (HONOURS).

Class II.—•C. B. Bamford, †Helen S. H. Brown, †A. Pool, •E. Scott, and †Gwennie Williams.

• Distinction in Medicine. † Distinction in Obstetrics.

FINAL EXAMINATION FOR DEGREES OF M.B. AND CH.B.

Part III.—Mary G. B. Allen, R. V. Berrington, C. H. Bradley, J. S. Bradshaw, R. S. Brock, Alison M. Brummitt, A. Cooke, J. W. Cowen, J. D. Craig, M. M. Datnow, Edwina M. Davies, L. Davies, R. Y. Dawbarn, Eileen M. Deane, W. T. Donovan, H. Duff, J. B. Elleray, H. W. Fell, H. R. Fisher, F. F. Fuller, G. A. Garrett, Susan Gluck, T. A. Griffiths, D. C. G. Hanlon, T. Hare, Fannie S. Holt, G. P. Huws, L. E. Johnson, R. W. Jones, R. Jones, A. L. Kerr, D. Kippax, J. Leggate, W. E. Lishman, J. H. M. Little, G. Lowe, G. Macdonald, Margaret S. Macdonald, Phyllis Marsh, G. A. Moulden, A. Newton, R. J. Prydderch, Gwendolin H. ff. Roberts, E. Rowlands, J. A. Scott, G. V. L. Taylor, Marjorie A. Unsworth, Mabel J. Watterson, N. Weinberg, and H. S. Welton.

Part II.—R. M. Ainsworth, H. W. Altschul, A. T. Ashcroft, Ethel Barrow, E. I. Bieber, ‡C. A. Birch, H. M. Boston, B. H. Brickman, W. G. Brookes, N. L. Corkill, R. F. Corlett, D. E. Davies, P. V. Dillon, J. L. Donnelly, ‡L. Earlam, J. C. Edwards, Sybil O. Edwards, ‡C. J. S. Garton, M. Goldberg, Dorothy A. Gough, Frances M. Greenhalgh, R. I. Greenshields, Gwyneth Griffith, C. A. Harris, ‡J. Hatton, Beryl M. Hawthorn, J. C. Heal, R. E. Horsfall, E. Hughes, ‡F. Hughes, S. M. Katz, C. Kaufman, B. Kay, J. E. S. Lloyd, W. J. Lloyd, ‡L. J. A. Loewenthal, T. R. E. Longton, H. McGrath, ‡G. McNichol, K. N. Mawson, J. W. Melville, F. Murgatroyd, E. L. Murphy, Winifred A. Nicholson, H. E. Pearson, H. Peaston, J. W. Reid, §Miriam Roskin, J. C. Ross, Ruth Simpson, N. P. Slade, I. Thomas, Margaret E. Thomas, E. F. Thompson, C. E. Unsworth, J. Unsworth, Rosalind Vacher, J. E. Walker, and F. W. Yates.

Part I.—R. M. Ainsworth, M. A. E. Azzam, H. E. Barrow, C. Baxter, B. H. Brickman, A. S. S. Brown, D. Cohen, J. Katz, Alice M. Luck, J. W. Melville, E. L. Murphy, Irene M. Neal, J. J. O'Donovan, Mary T. Penrice, W. J. Pierce, Mary A. Silcock, and W. L. Webb.

‡ Distinction in Forensic Medicine and Toxicology.

§ Distinction in Public Health.

DIPLOMA IN PUBLIC HEALTH.

W. J. Birchall, R. W. Brookfield, B. L. Chopra, H. M. Cohen, F. S. Fowweather, E. S. Gawne, Annie R. Niven, C. J. de V. Shortt, and J. F. D. Shrewsbury.

UNIVERSITY OF LEEDS.—At a congregation of the University held on July 5th degrees were conferred by the Chancellor, the Duke of Devonshire. Among these were the following Degrees in Medicine:—

Ch.M.—Digby Chamberlain.

M.B., Ch.B. (Second-class Honours).—Thomas H. B. Bedford, Andrew M. Claye, Harry Edelstein, Harry Ross, and Joseph G. Ward.

Ordinary.—William C. Abell, Herbert Bruce, Alexander Cannon, Joseph Cardis, Aileen N. Claye, Frederick Clegg, Maria L. Gaunt, George D. Gordon, Muriel D. Graham, Miles Hutchinson, John W. Pickard, Kathleen M. Potter, Leslie N. Pyrah, Norman A. Rymer, Norris A. Scadding, Geoffrey H. Sellers, John E. A. Simpson, George R. Sunley, Donald M. Sutherland, Harry Taylor, Wilfred Thistlethwaite, Edward W. Vincent, Hester E. Woodcock, and Donald Yates.

MEMORIAL SERVICE TO THE LATE SIR SYDNEY RUSSELL-WELLS.—A service in memory of the late Sir Sydney Russell-Wells was held on July 22nd in St. Margaret's Church, Westminster, where members of his family and a large number of his private friends were present, as well as many representatives of public bodies with which he was connected.

ADDENBROOKE'S HOSPITAL, CAMBRIDGE.—A post-graduate course will be held from Sept. 30th to Oct. 3rd inclusive. The course will consist chiefly of demonstrations of medical and surgical cases and of pathological specimens; also of advances in clinical pathology and biochemistry likely to be of interest to general practitioners. There will be no fee. A syllabus will be supplied later on application to the hon. secretary, Dr. Aldren Wright, at the hospital.

TROPICAL DISEASE PREVENTION ASSOCIATION.—Dr. Louis W. Sambon has left for Iceland under the auspices of this Association to continue there the epidemiological researches as to the causation of cancer which he began last year in Italy. It is proposed to extend his mission later to the West Indies, where he would carry on investigations on the same lines and establish comparisons between the factors of environment, climate, and natural history as bearing upon the incidence and causation of this disease.

ASSOCIATION OF CERTIFICATED BLIND MASSEURS.—The sixth annual general meeting of this Association was held on July 17th in the Armitage Hall of the National Institute for the Blind (by kind permission of the authorities). The meeting was presided over by Sir Robert Jones, and the chair was taken by Mr. Michael Whitfield, B.A., who is himself a blind masseur. Sir Robert Jones spoke of the excellent work done by members of the Association, and expressed the desire that the Association would extend its sphere of usefulness over an even greater area.

MEDICAL CONGRESS AND EXHIBITION AT SEVILLE.—The acting British Consul at Seville has forwarded to the Department of Overseas Trade a copy of the programme of the Second National Congress of Medicine to be held at Seville from Oct. 15th to Nov. 5th next, and a copy of the regulations for the Medical and Hygienic Exhibition to be held during the Congress. The Exhibition is open to exhibitors of all nationalities, but the Congress is limited to medical men authorised to practise in Spain, Portugal, and South America. The programme of the Congress (in Spanish) and a translation of the regulations for the Exhibition may be consulted at the Department of Overseas Trade (Room 53), 35, Old Queen-street, Westminster, London, S.W. 1.

MEDICAL HYDROLOGY AT CHELTENHAM. — At Cheltenham on July 12th and 13th, hospitality was provided by the local medical men to medical guests. Visits of inspection were paid to the Pump Room and Medical Baths, the Pittville Spa establishment and the hospital, and motor drives were taken to Cleeve Hill and other resorts. Dr. Fortescue Fox, on behalf of the Committee for the Study of Hydrology in Great Britain, delivered an address and described the policy of the Committee as two-fold: (1) to establish permanent recognised instruction in medical hydrology in the medical schools of this country; and (2) to obtain for the British spas the recognition and assistance to which they were entitled from the Government. Great progress, he said, had been made in the first of these aims, and lectures were now being given in medical schools in London and in several provincial universities; while visits of medical men and medical students to the various spas were being organised. In addressing the student visitors, Dr. Fox explained the particular properties of Cheltenham as a spa. The action of the Cheltenham climate and baths upon invalids was sedative or calming, and not, as at most of the British spas, tonic or exciting. The waters of Cheltenham were first of all eliminative, and there was a great variety of toxic or poisonous conditions to which they were applicable, but it must never be forgotten that external treatment was an essential part of hydrological work. Short lectures and practical demonstrations were then given by Dr. A. G. F. Forster on radiant heat, Dr. S. M. Hebblethwaite on the Vichy douche, and Dr. J. R. Collins on the paraffin, contrast, and whirlpool baths. Dr. R. Kirkland read a paper on the use of the waters, and cases from the hospital were shown by Dr. H. F. Powell.

THE board of management of the London School of Hygiene and Tropical Medicine have appointed Mr. R. W. Harris, formerly an assistant secretary at the Ministry of Health, to be the secretary of the school.

GENERAL MEDICAL COUNCIL AND THE IRISH FREE STATE.—On July 16th the Government of the Irish Free State introduced a Bill on Dail Eareann to authorise the General Medical Council to continue to exercise jurisdiction and authority under the Medical Acts in respect of medical practitioners in the State for the period of one year.

THE first number of the *Cripples Journal*, a shilling quarterly concerned with the progress of medical and social work in the care and cure of cripple children here and abroad, will be published to-day, July 26th, by the Shropshire Orthopædic Hospital, Oswestry. Among its contributors are Sir Robert Jones, Sister A. G. Hunt, and Dr. McCrae Aitken.

NORTH PERSIAN FORCES MEMORIAL MEDAL.—Wing Commander Harold E. Whittingham, Royal Air Force Medical Service, has been awarded the North Persian Forces Memorial Medal for the year 1923 for a paper on Observations on the Life-history and Bionomics of *Phlebotomus papatasii*, written in conjunction with Flight Lieut. A. F. Rook, R.A.F. Medical Service. This is the first award of the medal, which, in accordance with the terms of the Trust Deed of the Memorial Fund, is awarded annually for the best paper on tropical medicine or hygiene published in any journal during the preceding 12 months by any medical officer of under 12 years' service of the Royal Navy, Royal Army Medical Corps, Royal Air Force, Indian Medical Service, or of the Colonial Medical Service, provided the Memorial Committee consider the papers published have attained a standard of merit justifying an award.

ROYAL MEDICAL BENEVOLENT FUND.—At the last meeting of the committee 30 cases were considered and £508 10*s.* voted to 29 applicants. The following is a summary of some of the cases relieved:—

Widow, aged 64, of L.F.P.S. Glasg., 1896, who practised in Waterloo-road, London, and died September, 1902. On the death of her husband applicant was left unprovided for with the exception of a little help from her daughter. The daughter married and her husband died, and left her with a child now aged 7. The daughter took a post as waitress in a city café—unfortunately, she died in March of this year. The mother is now left without means and this little girl. Customers at the café collected £40, and a customer who has taken an interest in the case is allowing £1 a week at present. Voted £26.

Daughter, aged 64, of M.R.C.S. Eng., 1869, who practised in London and S. Africa and died in 1869. The family managed to live comfortably until the war. Most of their funds were invested in Russia and have all been lost. Since then the applicant, whose health is not good, has earned an average of about £14 a year by needlework. She receives from investments £25, and from a private charity £25, and a friend who can scarcely afford it £20. She lives at a ladies' home at Hampstead, and pays £56 a year. Would greatly appreciate a little help as she finds it difficult to pay her way. Voted £18 in 12 instalments.

Widow, aged 47, of L.S.A. Lond. who practised at Bristol and died in April, 1924. There are two children—daughter, aged 18, at school, and boy, aged 16, at school, who was at Clifton College. The applicant is arranging to sell the house she now resides in and to take a smaller one. Expects when all her affairs are settled to have about £500 left. Proposes to take one or two paying guests. Present rent £75 a year. Voted £10.

Widow, aged 48, of M.B. Aberd., 1895, who practised in Scotland and served in R.A.M.C. (T.) and in the Royal Air Force. Suffered from cancer and died in London Hospital, May 7th, 1924. During his illness help was given by the Officers Association and other funds. These have now stopped. Widow and family living in a furnished house at £8 8*s.* per month. Eight children, ages 10 years to 25. The eldest son is a medical student. It is likely to be three months before the question of pension is settled, and in the meantime the widow is without means and asks for some immediate help to provide home expenses. Voted £20.

Widow, aged 39, of L.R.C.P. & S. Edin. who practised at Liverpool and died September, 1923. Prior to his death husband went to S. Africa and took his typist with him, and left her all his belongings. The applicant was left with a daughter now aged 15, who is being educated at a convent in France in return for giving music and English lessons. Applicant has endeavoured to make a living as a musical comedy actress and earned £30 during the early part of the year, but has contracted severe eczema in the ankles which has stopped this. Mrs. Fuller has interviewed her and prepared a report. Lives with a sister and contributes towards the rent. Voted £20 in two instalments.

Widow, aged 30, of L.R.C.P. & S. Edin., 1888, who practised at Stockton-on-Tees and died June 24th, 1924. Her husband, who was a Territorial, joined up for the war and served mainly in the East. He contracted severe heart disease and died after a long illness. Applicant's savings were practically exhausted in looking after her husband, and she is now practically without funds. Has a boy aged 6. Applicant could take a post if arrangements could be made for the boy to be looked after. The Fund gave £26 to the husband just before he died. Voted £20.

Subscriptions may be sent to the Hon. Treasurer, Sir Charters Symonds, K.B.E., M.S., at 11, Chandos-street, Cavendish-square, London, W. 1.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED JULY 12TH, 1924.

Notifications.—The following cases of infectious disease were notified during the week, namely:—Small-pox, 57; scarlet fever, 1413; diphtheria, 654 (as against 619 of the previous week); enteric fever, 126; pneumonia, 497 (as against 657 of the previous week); puerperal fever, 32; cerebro-spinal fever, 6; acute poliomyelitis, 22 (as against 12 of the previous week); acute polio-encephalitis, 4; encephalitis lethargica, 81 (as against 103 of the previous week); continued fever, 1; dysentery, 5; ophthalmia neonatorum, 121. There were no cases of cholera, plague, or typhus fever notified during the week. Of the 57 cases of small-pox, 25 were notified from the county of Derby (Derby 6, Chesterfield 14, Chesterfield R.D. 5); 9 from the county of Nottingham (Nottingham 6); 2 from the county of Warwick (Coventry); 11 from Yorks, N. Riding (Middlesbrough 10); 7 from Yorks, W. Riding (Rotherham). Of the cases of encephalitis lethargica, 12 were notified from the County of London (Battersea 1, Camberwell 2, Chelsea 1, Finsbury 1, Hackney 2, Holborn 1, St. Pancras 1, Southwark 1, Woolwich 2); 2 from the county of Buckingham (Wycombe); 7 from the county of Durham (Chester-le-Street 2); 8 from the county of Lancaster (Liverpool 2, Manchester 2); 4 from the county of Warwick (Birmingham); 10 from Yorks, W. Riding (Sheffield 5, Gt. Ouseburn 2).

Deaths.—The deaths from diphtheria in the aggregate of the great towns were 24 as compared with 17 of the previous week, and in London 9 as compared to 4 of the previous week.

Medical Diary.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.

MONDAY, July 28th.—11 A.M., Surgical Registrar: Surgical Wards. 2 P.M., Dr. Scott Pinchin: Medical Out-patients. 2 P.M., Mr. Addison: Surgical Wards.

TUESDAY.—10 A.M., Dr. Drummond Robinson: Gynæcological Operations. 12 noon, Dr. Burrell: Chest Cases. 11 A.M., Dr. Endean: Venereal Diseases. 2 P.M., Mr. Banks-Davis: Throat, Nose, and Ear Dept.

WEDNESDAY.—10 A.M., Dr. Saunders: Medical Diseases of Children. 11 A.M., Medical Registrar: Medical Wards. 2 P.M., Dr. Pernet: Skin Dept.

THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Dept. 12 noon, Medical Registrar: Clinical Methods. 2 P.M., Mr. Bishop Harman: Eye Dept.

FRIDAY, August 1st.—11 A.M., Dr. McDougal: Electrical Dept. 11 A.M., Mr. Simson: Gynæcological Demonstration. 4 P.M., Dr. Archer: Chemical Pathology.

SATURDAY.—9.30 A.M., Dr. Burnford: Bacterial Therapy Dept. 10 A.M., Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Banks-Davis: Operations on the Throat, Nose, and Ear.

Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departments.

Appointments.

GOODWIN, A., M.D. Lond., F.R.C.S. Eng. and Edin., has been appointed Gynæcologist to the Prince of Wales's General Hospital, Tottenham.

WILKIE, D. P. D., M.Ch., M.D. Edin., F.R.C.S. Edin., to the Chair of Surgery in the University of Edinburgh.

General Infirmary, Leeds: MOIR, P. J., M.B., Ch.B. Glasg., F.R.C.S. Eng., Honorary Assistant Surgeon; LEE, HARRY, M.B., B.C. Camb., F.R.C.S. Eng., reappointed Honorary Ophthalmic Surgeon.

Certifying Surgeons under the Factory and Workshop Acts: NOBLE, C. L., M.B., Ch.B. Edin. (Portsoy, Banff); HOWIESON, H. W., M.B., Ch.B. Glasg. (Bo'ness).

Vacancies.

For further information refer to the advertisement columns.

Acton Hospital.—R.M.O. £150.
Bedford County Hospital.—Asst. H.S. £130.
Birmingham City Municipal Bacteriological Laboratory.—Asst. Bacteriologist and Asst. Venereal Diseases Officer. £600.
Birmingham Cripples' Union Orthopædic Hospital.—H.S. £250.
Birmingham, Rubery Hill and Hollymoor Mental Hospital, Northfield.—Asst. M.O. £350.
Brighton County Borough Sanatorium.—Res. M.O. £350.
Cambridge, Addenbrooke's Hospital.—Cas. O. and Res. Anæsth. £130. Also H.S. £130.
Cardiff City.—Res. Med. Supt. and Asst. M.O.H. £700.
Chesterfield and North Derbyshire Royal Hospital.—Cas. and Orthopædic H.S. £150.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—H.P. £125. Also Radiologist.
Croydon General Hospital.—Jun. H.S. £150.
Derby County Mental Hospital, Mickleover.—Sen. Asst. M.O. £450.
Freemasons Hospital and Nursing Home.—Res. M.O. £250.
Glasgow University.—Chair of Surgery.
Gloucestershire Royal Infirmary and Eye Institution, Gloucester.—H.S. £175.
Jersey General Hospital and Poor-law Infirmary.—R.M.O. £200.
Leeds Public Dispensary.—Sen. Res. M.O. £200.
Lincoln County Hospital.—Jun. H.S. £200.
Liverpool University.—Derby Chair of Anatomy. £800.
London Temperance Hospital.—Cas. O. £150.
Miller General Hospital, Greenwich-road, S.E.—Sen. R.M.O. £250.
Newcastle-upon-Tyne Hospital for Sick Children.—Hon. Asst. S.
Pontypridd Union, Llwynypia Hospital.—Supt. M.O. £700.
Rochdale Infirmary.—M.O. 300 guineas.
Royal Devon and Exeter Hospital.—Asst. P.
Samaritan Free Hospital for Women, Marylebone-road, N.W.—H.S. £100.
Sheffield Royal Infirmary.—Med. Reg. £400. Ophth. H.S. £60.
Sherwood Forest, Notts, Ransom Sanatorium.—Asst. R.M.O. £375.
Southampton County Borough.—Asst. M.O.H. £600.

Births, Marriages, and Deaths.

BIRTHS.

BOOBBYER.—On July 19th, at Warwick-road, Ealing, the wife of Dr. P. W. Boobbyer, of a son.

BUXTON.—On July 16th, at Wimpole-street, W., the wife of St. J. D. Buxton, F.R.C.S., of a son.

CANE.—On July 14th, at St. Luke's, Jersey, the wife of Major A. S. Cane, D.S.O., O.B.E., R.A.M.C., of a daughter.

GRIFFITH.—On July 16th, at Roydon, Asheldon-road, Torquay, the wife of Harold Kinder Griffith, F.R.C.S., of a daughter.

WORDLEY.—On July 17th, at St. Mildred's, Plymouth, the wife of Dr. Eric Wordley, of a son.

MARRIAGES.

BAIN—THIRKELL.—On July 19th, at St. Lawrence's Church, Catford, Lawrence Weir Bain, M.D., M.C., to Doris Marion, eldest daughter of Mr. and Mrs. Howard Thirkell, of Catford.

SATOW—NEILSON.—On July 16th, in the Cathedral, Westminster, Lawrence Lancaster Satow, M.C., M.R.C.S., &c., to Margaret de Vercherès, younger daughter of Mr. and Mrs. Norman R. Neilson, of Neilsonville, in the province of Quebec, Canada.

DEATHS.

BALLARD.—On July 12th, at Walford House, Smarden, Kent, Richard Pitt Ballard, M.C., M.B., B.S., aged 38 years.

BUTLER.—On July 18th, suddenly, at his residence, Dinton House, Harrow Weald, George Henry Butler, L.R.C.S., L.R.C.P., in his 71st year.

MANTLE.—On July 10th, 1924 (very suddenly), Alfred Mantle, M.D., M.R.C.P., of Archway House, Harrogate.

PIDCOCK.—On July 16th, at a nursing home, George Douglas Pidcock, M.A., M.D., M.R.C.P., &c., of Hampstead, in his 73rd year.

WENYON.—On July 18th, at Lugano, Charles Wenyon, M.D., M.Ch., L.R.C.P., of Fitzjohn-avenue, Barnet, aged 75 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NORTH WALES UNIVERSITY COLLEGE, BANGOR.—On July 17th the honorary degree of LL.D. was conferred by the College on Sir Donald MacAlister "in recognition of his distinguished services to medical science and as a university administrator."

DONATIONS AND BEQUESTS.—Lord Bearsted has informed Sir Arthur Stanley, treasurer of St. Thomas's Hospital, that he will contribute a sum of £5000 for the funds of the hospital provided that four other persons each contribute a similar amount.—The late Mr. Thomas Edward Dingwall, of Clapton Common, Middlesex, bequeathed to the Royal Northern Hospital, Holloway, £1000 for the purpose of founding a bed to be known as the "Thomas E. Dingwall Bed," "as a token of gratitude for the treatment he received at the hospital in the year 1894."—The Manchester business house of William Sutcliffe, Ltd., manufacturers and warehousemen, have commemorated the golden jubilee of the firm by sending a cheque for 50,000 shillings to the Lord Mayor as a gift to certain Manchester and Salford charities. They have expressed the hope that all firms who pass similar milestones will thus remember the local charities.—The late Miss Elizabeth Sophia Trotter, of Harrogate, besides large bequests to church and other institutions, left £1000 to the Hostel of St. Luke (Nursing Home), London; £2000 to the Royal Bath Hospital, Cornwall-road, Harrogate; £3000 to the Harrogate Infirmary; £500 to the Red Cross Society; £1000 to the Leeds General Infirmary; and £2000 to the Yorkshire Home for Incurables, Harrogate.

Notes, Comments, and Abstracts.

WHY ARE FACTORIES CLOSED TO THE MEDICAL OFFICER OF HEALTH?*

BY LIEUT.-COLONEL F. E. FREMANTLE, O.B.E., M.P., F.R.C.S., F.R.C.P.

IT is strange that so little attention has been paid to industrial hygiene by writers on the public health. The Registrar-General showed half a century ago that, as compared with the mortality of all males, taken as 1000, that of agricultural labourers[1] was only 602, of shopkeepers 973, of doctors 966; while the mortality for painters, plumbers, and glaziers was 1120, and that of men in iron and steel manufacture was 1301, of potters 1706, and that of unoccupied males 2215. Here, surely, was a key to the cause of much preventable sickness, inefficiency, and mortality. And yet the subject received little notice in the text-books or in the lectures and examinations for the Diploma in Public Health, until the Factory and Workshop Act, 1901, threw sanitary responsibilities for the workshops on the sanitary authorities. And then only in respect of certain limited functions. Sir John Simon's classic on English Sanitary Institutions makes no allusion to the supervision of health in factories; nor do Mr. and Mrs. Sidney Webb, in their handy book on "The State and the Doctor"; and I have searched my library in vain for any description of the Chief Inspectors' department and methods.

The reason is clear. Public health and its diplomas have been built up by the Privy Council, and the late Local Government Board, and by local authorities and their medical officers, pioneered by the army and the army surgeons in the Crimea under the acid test of war. They have been directed to the needs of the medical officer of health in this country; they have been limited by the experience and training of the only teachers available, with few exceptions medical officers of health, or inspectors under the Local Government Board. It is almost by chance, and only after great delay, that the "principles and practice of hygiene" are being extended to their proper scope, including the physiological and psychological conditions of the individual, the need of early correction of defects, the need of pure, rather than ad hoc research, the supervision of health in every walk of life from the cradle to the grave, under whatever Government department; and not least, the adaptation of individual and communal life to other climates and other racial, social, industrial, and parasitic surroundings. The forthcoming establishment of the London School of Hygiene and Tropical Medicine, due to the generous benefaction of the Rockefeller Trustees, and the wise coöperation of our Government, will be based on these broader lines.

[Colonel Fremantle then outlined the history of industrial hygiene, which, he said, was mainly confined to that of factory supervision by the Home Office. He traced this history from the Factory Reform Bill of 1802, the Factory Act of 1833, and the first appointment of certifying surgeons in 1844, up to modern times, when the dual control of the local authorities who employ medical officers of health and the Home Office, under which department the inspectors of factories and certifying factory surgeons work, leads to lack of coördination in many respects. He continued:—]

The Disadvantages of Dual Control.

One of the foremost and wisest of medical officers of health gives me privately his experience of the dual position in one of the big industrial cities: "I have felt strongly on this subject for a great many years. My own feeling is that the Home Office has not made their factory and workshop inspection a health service. They have a lot of very competent engineers and chemists, but they ought to have far more competent medical investigators and, I think, a medical chief. As you know, there is a duplicate control partly by the Home Office and partly by the local authority, and as a result, I am very sorry for the manufacturer, who frequently has an inspector from the Home Office and one from the local authority in the works on the same day and at the same time. The local authority's control of factories is almost a negligible one, dealing as it does with sanitary accommodation. In regard to workshops, our control, of course, is very much larger, but in recent years the Home Office has appointed so many workshop inspectors who go over all the work supposed to be done by the local authority, that it is a real hardship on the occupier of the workshop at times. A great many lay inspectors recognise that they have to find something to talk about, and suggest at every visit, so that the workshop owner never knows when he has done. Personally, I am not greatly concerned as to who should do these things, so long as they are done. If the local authority is to take it in hand, then it ought to be a real workshop or factory service, and they must be given the control and responsibility necessary and must not be interfered with. At the present time I believe that local authorities do very little, because they are always up against something that the factory inspector has done or suggested. It is quite true that as medical officer of health, I am supposed to have power to investigate anything in the district. If I tried to find out what it was that was damaging the health of a set of workers in a particular factory I might be told to mind my own business, and that it was the function of the factory inspector. Consequently, the work is left unless, of course, it is a very serious matter, and then one would report it direct to the factory inspector for investigation. I have said all this, but I do not want you to think that there is any friction between the Home Office inspectors and myself. They have always been most courteous and willing to help, and we could not have a nicer lot of men than those who are here just now."

The Factories Bill.

[Colonel Fremantle criticised the findings of the departmental committee on medical examination of young persons for factory employment, appointed this year by the Home Secretary, in so far as its proposals (Cmd. 2135) were framed on the basis of the present administration. He continued:]

The Factories Bill was subsequently introduced on May 22nd. It is a great consolidating and amending measure of 143 clauses and 100 pages, prepared under the late Unionist Government. The mere titles of the parts of the Bill indicate that the factory code and its administration are essentially devoted to the health and physical welfare of the people: I. Health; II. Safety; III. Welfare—viz., drinking-water, washing facilities, first-aid, facilities for sitting, keeping and drying clothes, protective clothing, welfare orders, weekly rest-day; IV. Health, Safety and Welfare (Special Provisions); V. Accidents and Industrial Diseases; VI. Employment of Women, Young Persons, and Children; VII. Special Applications and Extensions; VIII. Home-work; IX. Piece-work and Wages; X.-XIV. Administrative, Legal and Definitive.

There could be no doubt to a judicial referee that these matters are essentially part—and a very large and essential part—of the science of public health. And the further limitations and standards to be imposed are, from the standpoint of those concerned for the national health, all to the good. The Factory Department, indeed, of the Home Office, is a second Ministry of Health; or rather, since the Board of Education is a second, this is a third Ministry of Health. Nor does the present Bill seek materially to change the position. It certainly invokes the assistance of the local education and sanitary authorities at the will of the Home Secretary. But it actually deprives the local sanitary authorities of their present responsibility for the sanitation of workshops. The term factory is to include workshops and workplaces, and so the Home Secretary is responsible for the whole administration of the Act, and the gradual devolution of powers to the local authorities, instituted in 1901, is left to his discretion to rescind or to develop as he, in his successive incarnations, may think fit. Instead of the "certifying surgeon" we are to have the "appointed doctor" throughout, and his appointment and remuneration is entirely in the Home Secretary's hands. He may, of course, be the local school medical officer or medical officer of health, but he seldom will be so, except where the Home Secretary delegates his powers in any area to one local authority or another. At the will of the Home Office, then, the medical officer of health may be more generally barred from the workshops than ever.

Defects of the Present System.

Who is the Inspector? Who is he, indeed, to whom in actual practice the whole health of the nation in its industrial life is committed? Is he medically trained? In a few cases only. Is he trained as a sanitary inspector? Or is he an engineer, trained only to look on accidents as due to bad machinery or preventable negligence? With few exceptions, one cannot believe his attitude of mind is as helpful to the main purpose of factory legislation as the medical officer of health, school medical officer, or sanitary inspector.

And he works from Whitehall or at least from a centre covering a large area, and the supervision of certain special industries—as of certain diseases—over a large area is obviously essential. But what can he know intimately of the personnel in the factory, employer, management or employed, and of the ways in which they interpret the

* Abstracted from a paper read to the Section of Industrial Hygiene at the Congress of the Royal Sanitary Institute, held in Liverpool, July 14th to 19th, 1924.

[1] Figures revised for England and Wales, 1890–2.

regulations? Would it not be of value to bring the local authorities and their trained officials generally into the system?

How can the lay inspector decide when re-examination of a young person by a doctor is required? Yet under Clause 92 of the new Act, the whole responsibility continues to rest with him. And over and over again time alone can show if a young person is fit for the particular industry for which he has been passed by the appointed doctor; the proof of the pudding is in the eating.

And how is liaison established with the school medical officer, where the Home Secretary has not delegated his powers to the local authority; with the tuberculosis officer with infectious disease in the area; with home conditions? No, at present the medical officer of health and the whole health system of the country are barred from the factories and workshops. And the reason of their being barred is that the Factory Code has grown up in a separate groove, and employers feel safer in this groove, and no Government has the enterprise to establish a comprehensive system of health promotion in this country, as intended in the creation of the Ministry of Health.

Moreover, as one of the most distinguished and experienced authorities of the day expresses it: "Factory administration is the great example of centralised Government without any corresponding local Public Health administration, except in minor matters. On some points it would be easy to indict it; on others it has been a valuable safeguard against local inertia or corruption, and it has enabled large views sometimes to be taken."

The Alternative.

It will be recognised that under the new Bill the Home Secretary has power to make valuable experiments in devolving certain powers to local authorities. But it would surely be of value if he could further devolve all his powers under the Bill to certain county borough councils, willing and able to undertake them, under the central supervision of the experienced inspectors of the Home Office, comparable to the control of local authorities by the Ministry of Health and Board of Education. This would be a useful and, I believe, a safe experiment, which would work well in the interest of employers and employed, and would benefit considerably the health of the general community. Further devolution might follow in course of time to the councils of counties, of boroughs, and of the larger urban districts. But until county councils are given supervising powers in connexion with health, this devolution must be incomplete. For the councils of the smaller districts would not for the most part be capable of undertaking the responsibility and giving the constructive help required. The district medical officer of health and sanitary inspector must, it would seem, continue to be barred from the factories, unless, and until, the system of local government is overhauled, as I hope it may be before long, and a proper county system evolved with suitable allocation of interests, supervision and organic coöperation between the county and its constituent districts. By then it is to be hoped that future medical officers of health and sanitary inspectors will be taught more of industrial hygiene than we were 30 years ago.

As to the Ministries, it would be impossible to transfer the Factory Department of the Home Office to the Ministry of Health, unless the latter were to be relieved of some of its work, not connected with health, such as local government control. It has also been suggested that housing should be transferred to the Board of Works. But these transfers cannot be lightly undertaken. Nor is piecemeal reorganisation of the departments sound. In the interests of the national health we must consider the universal grip that health considerations must have on every section of governmental responsibility. In this view it seems clear that the general conclusion of Lord Haldane's Committee on the Machinery of Government holds good. Every ministry must, for instance, have its department of finances; and most must have a department of health and welfare. The analogy of the army again is useful; for the Army Medical Service not only has complete control of the Royal Army Medical Corps, but also has technical control of the medical and sanitary personnel, to whatever formation, regiment, battery, army corps, or depôt it may be attached; and the Director-General, Army Medical Service, is responsible for advising and therefore collecting all information as to the health of any unit or man in the army. But the commanding officer of each unit or formation is primarily responsible for the health of the men under him, and for the immediate command of medical and sanitary personnel attached.

So, it seems clear, must the health services of civil government be gradually developed. I would see all medical and sanitary personnel recruited and controlled throughout their career and allotted to the several services of the Government departments by the Ministry of Health, to whom they should be technically responsible. But each Government department should have its own health section, as it has its own section of finance, an integral part of that Ministry with direct access to the Ministers, and the Minister in charge would be held responsible for the application of services in such a way as to assist him in the discharge of his responsibilities in connexion with health. The collateral, technical chain of relation between the personnel and the Minister of Health would bring that Minister and his department into intimate relation with the whole activities of national life and would make him in fact, what hitherto he has been partially in fact, but largely only in name, the head and centre of a complete system of national health.

Anyone daring to suggest that this system is complicated, unpractical, should be referred to the army, where a similar, clear, and definite division of responsibility proved of infinite value under the acid test of the late war. It is the only solution.

PUBLIC HEALTH IN BIHAR AND ORISSA.

IN THE LANCET of July 12th (p. 100) we dealt with certain portions of the last official Public Health Report from Patna, but other aspects of the conditions in Bihar and Orissa deserve notice.

The "Special Epidemic Reserve."

A "Special Epidemic Reserve" of 100 vaccinators was entertained from April to September for cholera and other epidemic duty, the work done (disinfection, treatment of wells, and the use of simple remedies) being very satisfactory and much appreciated. A cholera survey of the local conditions in four *thanas* of Cuttack district, where there was undue prevalence of the disease, was also started. Small-pox caused 2560 deaths, showing a mortality of 0·07 per 1000, compared with 0·2 in the previous year and 0·3 in the quinquennium. No district returned a higher ratio than 0·2 (in Purnea and in Singbhum), and in Angul there was not a single fatal case. "Vaccination is neither compulsory nor free. . . . It would, therefore, appear to be wise and proper to organise the work more effectively, and to make vaccination compulsory and free, in order to get the whole population protected, and thus abolish a disease which is of all diseases the most easily and cheaply preventable." As to the justice of this opinion there can be no doubt. There was a general fall in the mortality from "fevers" (17·0 deaths per 1000, compared with 22·6 in 1921 and 23·4 in the decennium). In Puri district of Orissa division (bordering on the Bay of Bengal) the lowest ratio was recorded (8·6); in Angul district of the same division (but inland) the ratio was 19·6; and in Palamau (Chota Nagpur) 22·1. Colonel Ross does not consider "that it is practicable to prevent malaria, or to reduce it permanently, or on any large scale, by the use of quinine"; he believes that "the adoption of non-productive anti-malarial operations, such as draining, levelling, filling hollows and oiling water surfaces is also not a feasible means of prevention on a large scale over an enormous area. . . . It is therefore, in my opinion, a waste of time to discuss and advocate the use of such measures, except in special cases. . . . What is wanted is a policy of malarial prevention, which will pay its own way. . . . Such a policy is possible; it is already being carried out in Italy and in Spain. It consists in combining agricultural improvement with sanitation, by draining or flooding marshes and wet lands in a scientific manner, so as to produce larger crops, and at the same time to reduce the breeding of transmitting mosquitoes and the spread of malaria. It improves the health of the people and their prosperity at the same time."

Plague Mortality.

The total deaths from plague numbered 15,066, giving a ratio of 0·4 per 1000, the same as in 1921, but much lower than that of the decennium (1·0 per 1000). Orissa and Chota Nagpur divisions were quite free, also Purnea and Santal Parganas districts in Bhagalpur division. The highest incidences were recorded in Muzaffarpur, Saran, and Darbhanga districts, where the deaths returned were 1·3, 1·5, and 1·6 per 1000 respectively. In the rural areas the ratio was 0·4, Saran, Darbhanga, and Muzaffarpur recording mortalities of 1·6, 1·4, and 1·2 respectively. In the towns the mortality was 1·1 per 1000, the small town of Lalganj in Muzaffarpur district suffering most (17·3), and Darbhanga next (10·5). Colonel Ross considers that "the permanent separation of the rats from the people is the only permanent measure of prevention." This makes it an "economic question," which for this province means agricultural improvement.

Dysentery and diarrhœa caused 18,037 deaths, giving a ratio of 0·5 per 1000, as compared with 0·9, the decennial average. As usual, these affections were most prevalent in Orissa division, where the mortality was 2·7 per 1000. The districts of Cuttack and Puri suffered most with death ratios of 3·7 and 3·4 per 1000. In the rural areas of the province the mortality was 0·5, while in the towns it was

0·9 per 1000. Among the former Cuttack and Puri showed the same incidence as for the respective districts *including* the towns—viz., 3·7 and 3·4: No other rural area in the whole province showed an incidence higher than 0·9 per 1000, except Sambalpur (2·1). The report states that "the prevalence of dysentery and diarrhœa in Orissa is probably associated with the climatic conditions, and is to a large extent due to the bad state of the water-supply in many parts of this division" [Orissa]. It might be suggested that climatic conditions have little influence as compared with a bad water-supply, and that the public health authority is undoubtedly responsible for remedying this latter defect. Investigations as to the prevalence of hookworm disease have been carried out in this as well as in other provinces, and show that from 50 to over 70 per cent. of the persons examined were affected. Its prevention "entails both the treatment of infected persons and an alteration in the habits of the people, requiring them to abandon the general practice of relieving themselves in the fields, and to take to the use of latrines," so as to avoid conveyance of infection; "treatment alone is largely a waste of time."

School medical inspection has resulted in the examination of 14,476 pupils, and its usefulness is becoming better known and more appreciated. At the Sanitary Laboratory 1013 chemical and bacteriological examinations were carried out by Dr. K. N. Bagchi and his assistant, a considerable amount of food adulteration being detected. In the engineering branch of the Public Health Department several schemes for water-supply and drainage have been, or are being, carried out; but Mr. J. R. Taylor, M.I.C.E., superintending engineer, considers that the present staff of *three* gazetted officers in this branch is insufficient; and that "the department should be reorganised and brought into line, so far as possible, with that of the Public Works Department. The improvement of public health is certainly one of the most crying needs of the country, and it is far from satisfactory that so important a branch as that of the engineering department should be hampered by its staff being overworked with unsatisfactory conditions of service and low pay." With an area of over 83,000 square miles, and a population of 34,000,000 to care for, there would appear to be no possible difference of opinion on this matter.

Vaccination Report.

The triennial report on vaccination[1] "for the years 1920-21, 1921-22, and 1922-23," by which are meant the periods from April 1st to March 31st, states that the operations performed each year numbered, on an average, 1,001,072, as compared with 1,041,667 in the preceding triennium; the primary operations averaged 946,781, and the revaccinations 54,291. The decrease is attributed to political unrest and active interference with the work of the staff. "It appears, however, that the tide is on the turn, and that the difficulties experienced are gradually becoming fewer and less serious." The percentage of success in the operations was satisfactory, being 96·29 in 1920-21, and 98·26 and 98·32 in the succeeding periods. But of the 1,081,900 children available for vaccination in the year 1922-23, only 331 per 1000 were vaccinated, against 396 per 1000 in the previous year. In the municipal towns, out of 30,006 infants available, the vaccinated numbered 13,567, leaving 16,439 unprotected. Colonel Ross concludes his report with the statement that the work of the period under review has been considerably interfered with by political agitation and discontent among the vaccinators, "owing to obstruction in their work and difficulties in realising their fees." They are underpaid. "There is serious risk of the province relapsing into an unvaccinated state. . . . A change of policy is urgently needed, introducing free and compulsory vaccination throughout the province, and making the vaccinators paid servants instead of giving them licences to take fees from the people." It is to be hoped that the provincial authorities will give effect to these recommendations as early as is practicable.

THE MENTAL HOSPITAL OF SYRIA.

To those not familiar with the origin and work of the Lebanon Hospital for Mental Diseases at Beyrout the report of the hospital for 1923-24 should be of unusual interest. Until its foundation by the late Dr. Theophilus Waldmeier in 1900 there was no provision of any sort for the care of the insane in the whole of Syria. There is probably no other place outside the Orient where a person mentally afflicted receives so little consideration from the general public, or where he will more readily be forced into the realm of incurables. In the East it is the popular belief that those who suffer from mental disease are *mejnun*, or possessed by a demon, and numerous methods are adopted by the ignorant and superstitious to cast him out. For instance, a cross is often burnt with a hot iron on the head of insane men and women in hope of "exorcising the demon." In some places such unfortunates, especially women, are kept in some lonely and dark cave until they die. Others are sent, according to what religion they may profess, to some religious shrine, where they are treated as being "possessed" and subjected to various forms of exorcism. The Lebanon Hospital remains the only mental hospital in that country, and receives patients of a strange variety of races—Christian, Jewish, and Moslem alike—from a wide area of the Near East. Funds are provided by committees in various European countries and in America. The income is also maintained by grants from various local authorities towards the maintenance of their pauper patients. Damascus recently withdrew their chronic insane, with the intention of attempting to maintain them in Damascus itself at a cheaper rate, but it is believed that this experiment is proving a failure.

In all 236 patients were under treatment last year, of whom 131 were new admissions, from which it may be gathered that the hospital is a place of treatment for acute cases rather than a mere refuge for the destitute and chronic insane. Complete recoveries numbered 26, and 44 left much improved. There are no striking features in the table of ætiology, but this is incomplete, because local government authorities cannot be persuaded to supply even the scantiest information as to the patients they send. "To get them speedily admitted into the hospital, and thus away from causing further annoyance, is about the extent of the interest bestowed on them, and a shrug of the shoulders the reply to my request for details."

An abundant water-supply has now been obtained by sinking a well, a fact the importance of which will be appreciated when it is known that all water was previously purchased from outside, and that a supply is necessary to enable the land belonging to the hospital to be cultivated. Students from the American University at Beyrout are now attending lectures and clinical demonstrations at the hospital. "Such instruction has not been given to these students before, and as these are the men who will be scattered as doctors all over the East, enlightened ideas and skilled methods of treatment will thus become widely diffused through these lands."

The staff consists of the director, Dr. H. Watson Smith, and a British head attendant, steward, matron, and assistant matron; the nurses are local Syrians.

AUTOMATIC GAS-BAG PRESSURE CONTROL.

Messrs. Coxeter and Son, Ltd., of 171–175, Pancras-road, London, N.W., have sent an account of an apparatus which comprises twin metal levers placed one on each side of the gas bag. These, when forced apart by the expanding bag, compress the feed tube, causing back pressure in a pressure-reducing valve attached to a N_2O cylinder, thus cutting off the gas. The bag control is fitted with a spring, the tension of which can be altered with one hand in order that any desired pressure can be maintained in the bag. When gas is allowed to escape from the bag the restriction on the rubber bag is relaxed and gas again flows automatically from the cylinder. The bag is maintained adequately full without any attention from the anæsthetist. Gas only flows from the cylinder during inhalation, thus saving gas, and this without any action on the part of the anæsthetist. The bag control is very simple in construction, and the claim is made that it is practically impossible for it to get out of order.

THE "HYJAX" WATER-CLOSET SEAT LIFTING APPARATUS.

THIS is an appliance for raising or lowering a closet seat and is worked by means of the foot. It consists of a pedal operated lever connected with the closet seat and provided with a compression cylinder for controlling its descent. One great advantage of the apparatus from an hygienic point of view is that it obviates the necessity for handling the seat, while there is no risk of breaking the basin by the accidental fall of the seat. The work of the housemaid in emptying slops is also simplified. The apparatus, which costs 45*s.*, is on view at Messrs. John Bolding and Sons, Ltd., Grosvenor Works, Davies-street, London, W. 1, from whom it can be purchased.

Arrow.—The risk may be small, but the procedure should never occur. The transfers should always be effected by damping off and using fresh gum. The second question depends upon too many circumstances to make a reply possible.

L. C. B.—The Report of the Departmental Committee appointed to Inquire into Certain Matters Relating to the Diet of Patients in County and Borough Mental Hospitals, abstracted in THE LANCET of July 12th, can be obtained from H.M. Stationery Office, Imperial House, Kingsway, London, W.C. 2, price 6*s.* 6*d.*

[1] Patna: Government Press. 1923.